(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 February 2001 (15.02.2001)

PCT

(10) International Publication Number
WO 01/11502 A2

(51) International Patent Classification[7]: G06F 17/30

(21) International Application Number: PCT/US00/21701

(22) International Filing Date: 8 August 2000 (08.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

09/372,410	10 August 1999 (10.08.1999)	US
09/372,402	10 August 1999 (10.08.1999)	US
09/371,161	10 August 1999 (10.08.1999)	US

(71) Applicant: AKAMAI TECHNOLOGIES, INC. [US/US]; 500 Technology Square, Cambridge, MA 02139 (US).

(72) Inventor: TSIMELZON, Mark; Apt. 313, 745 South Bernardo Avenue, Sunnyvale, CA 94087 (US).

(74) Agents: MAJERUS, Laura; Fenwick & West LLP, Two Palo Alto Square, Palo Alto, CA 94306 et al. (US).

(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW.

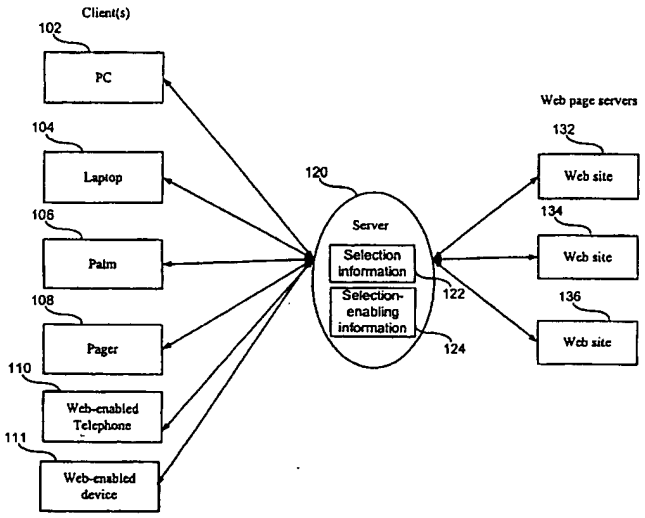
(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— *Without international search report and to be republished upon receipt of that report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS FOR COMBINING PARTS OF DIFFERENT WEB PAGES



(57) Abstract: A method and system that allows users to select certain portions of more than one web page for later viewing. The user selects certain portions of the web pages that he wishes to view at a later time. The user's selection information is saved and, when the user views the web page at a later time, only the portions of the web page indicated by the user are displayed for viewing by the user. Thus, the user views only preselected portions of the web pages. These web pages can be combined into combination web pages, based on more than one web page or site. A combination web page also can be created directly from more than one page or site without first creating an intermediate shortpage.

WO 01/11502 A2

Method and Apparatus for Combining Parts of Different Web Pages

BACKGROUND OF THE INVENTION

The present invention relates generally to computer networks and, specifically, to a method and apparatus that allow users to select certain portions of web pages to form "short" web pages.

The expanded popularity of the World Wide Web ("the web") has brought new problems for web users. As users obtain more and more information from the web, they must visit greater numbers of different web pages to obtain the information. This information is often contained on several separate web pages or web sites. Alternately, a user may wish to see only a small piece of information that is contained in a very large and complex page or site. The user must search through the pages in which he is not interested to reach the information that he wishes to see.

Many users visit the same sequence of web pages or sites on a daily or a regular basis. For example, some users might check the weather or their stock portfolio on a daily basis. Even though a user may visit the same web pages and/or sites regularly, the user must still take individual actions to visit each of his regularly visited web pages or sites. For example, the user may have to enter the web addresses of each page or click on each page in a list of saved addresses in his browser. This repeated entry of web addresses is time consuming and involves un-needed repetitive action by the user.

What is needed is a way to avoid regularly re-entering the same multiplicity of web addresses and a way to avoid having to navigate through multi-level web sites to reach desired information.

SUMMARY OF THE INVENTION

A described embodiment of the present invention allows users to select certain sub-elements of web pages for later viewing. The user can use any of a wide variety of client devices to view the web page, such as a computer, a handheld device, or a cell phone. When the user views the shortened web page at a later time, only the sub-elements of the web page selected by the user are displayed. Thus, the user views only preselected sub-elements of the web page.

A further aspect of the described embodiment allows users to select certain sub-elements of multiple web pages or sites as part of a web page. The user's selection information is saved and, when at a later time, only the sub-elements of the web pages and/or sites indicated by the user are displayed for viewing by the user. Thus, the user views only preselected sub-elements of the web pages or sites. In the described embodiment, a page based on multiple web pages or sites is called a "combopage" (short for "combination page") and is based on a combination of selection information from single pages or sites. Other embodiments of combopages need not be based on combination of selection information for single pages.

Multiple users can share a short page. Such a shared shortpage or combopage is called a shared portal. For example, multiple users can place information on a short page or combo page. Alternately, multiple users can view a shortpage or combopage created by a third party or third parties.

In accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a method for creating a combination web page, comprising: allowing a user to choose a subset of elements, some of which appear on a first web page and some of which appear on a second web page; saving the user's choices; and creating a combination web page that is based on the first web page and the second web page, and includes the elements chosen by the user in accordance with the user's saved choices.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a method for creating a combination web page, comprising: storing in a memory selection information specifying the elements on a combination web page, the combination web page being based on at least two original web pages; retrieving the original web pages upon which the combination web page is based; and creating the combination web page from elements on the original web pages in accordance with the selection information.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a computer-implemented method performed by a server data processing system, comprising: receiving, from a client, a request for multiple web pages; retrieving the multiple web pages; sending the requested multiple web pages to the client; receiving, from the client, selection information for the requested multiple web

pages, the selection information indicating a subset of the information of the web pages that is smaller than the set of all information on the web pages; and storing the selection information in the server data processing system.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a computer-implemented method performed by a server data processing system, comprising: receiving, from a client, a request for a user's combination web page; retrieving at least two web pages upon which the user's combination web page is based; selecting portions of the retrieved web pages in accordance with selection information of the user stored in the server data processing system; and sending the user's combination page, containing the selected portions of the retrieved web page to the user.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a computer-implemented method performed by a client data processing system, comprising: sending, by a client, a request for at least two web pages; receiving the requested web pages; allowing the user to select portions of the received web pages as being hidden or shown, the hidden portions being indicated by selection information; and sending, to a server, the selection information for a combination web page formed by the at least two web pages.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to an apparatus that creates a combination web page, comprising: software portions configured to allow a user to choose a subset of elements, some of which appear on a first web page and some of which appear on a second web page; software portions configured to save the user's choices; and software portions configured to create a combination web page that is based on the first web page and the second web page, and includes the elements chosen by the user in accordance with the user's saved choices.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to an apparatus that creates a combination web page, comprising: software portions configured to store in a memory selection information specifying the elements on a combination web page, the combination web page being based on at least two original web pages; software portions configured to retrieve the original web pages upon which the combination web page is based; and software portions configured to

create the combination web page from elements on the original web pages in accordance with the selection information.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a server apparatus, comprising: software portions configured to receive, from a client, a request for multiple web pages; software portions configured to retrieve the multiple web pages; software portions configured to send the requested multiple web pages to the client; software portions configured to receive, from the client, selection information for the requested multiple web pages, the selection information indicating a subset of the information of the web pages that is smaller than the set of all information on the web pages; and software portions configured to store the selection information in the server data processing system.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a server apparatus, comprising: software portions configured to receive, from a client, a request for a user's combination web page; software portions configured to retrieve at least two web pages upon which the user's combination web page is based; software portions configured to select portions of the retrieved web pages in accordance with selection information of the user stored in the server data processing system; and software portions configured to send the user's combination page, containing the selected portions of the retrieved web page to the user.

Advantages of the invention will be set forth in part in the description which follows and in part will be obvious from the description or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims and equivalents.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments of the invention and, together with the description, serve to explain the principles of the invention.

Fig. 1 is a block diagram of data processing elements in accordance with a preferred embodiment of the present invention.

Figs. 2(a) and 2(b) are block diagrams showing an information flow in a preferred embodiment of the present invention.

Fig. 3(a) shows a display of a startpage that allows a user to create and edit shortpages and combopages.

Figs. 3(b)-3(e) show the HTML source for a startpage.

Figs. 4(a)-4(c) are flow charts showing how a client and a server interact to perform shortpage operations, such as create, edit, delete, and view.

Fig. 5(a) shows a display of an exemplary web page.

Figs. 5(b) and 5(c) show the web page of Fig. 5(a) displayed along with selection-enabling information.

Fig. 5(d) shows the web page of Fig. 5(b) with a different level of block detail.

Fig. 5(e) shows a web page that allows the user to view/edit shortpage properties.

Fig. 6 is a flow chart showing how the client and the server interact to allow the user to create/edit a shortpage.

Fig. 7 shows an example of HTML parsing used to create/edit shortpages.

Fig. 8 shows an example of a split page method used to create/edit shortpages.

Fig. 9 is a flow chart of how to determine a display level when creating shortpages.

Fig. 10 shows the startpage of Fig. 3(a) after a shortpage has been created based on the web page of Fig. 5(a).

Fig. 11 shows the shortpage created from the web page of Fig. 5(a).

Fig. 12 shows a fullpage corresponding to the web page of Fig. 5(a).

Fig. 13 is a flow chart showing how the client and server interact to allow the user to view a shortpage.

Fig. 14 is a flow chart showing details of determining whether a URL is the URL of a shortpage.

Fig. 15(a) shows a display for creating a combopage.

Fig. 15(b) shows an example of a combopage.

Fig. 16(a) is a flow chart for creating a combopage.

Fig. 16(b) is a flow chart for displaying a combopage.

Fig. 16(c) shows a web page that allows the user to view/edit combopage properties.

Fig.17(a) shows a display for viewing a parameterized combopage.

Fig. 17(b) shows an example of a parameterized combopage.

Fig. 17(c) shows another example of a parameterized combopage.

Fig. 18(a) is a flow chart for creating a parameterized combopage.

Fig. 18(b) is a flow chart for displaying a parameterized combopage.

Fig. 19 is a flow chart for viewing a shortpage when the client is a personal digital assistant.

Fig. 20 is a block diagram of data flow when a shortpage or a combopage is viewed on a personal digital assistant.

Fig. 21 is a display of a shared portal shortpage.

DETAILED DESCRIPTION OF EMBODIMENTS

Reference will now be made in detail to several embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever practicable, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

I. General Discussion

A described embodiment of the present invention allows users to select certain sub-elements of one or more web pages as a shortpage. The user selects certain sub-elements of an original web page to create a shortpage. The user's selection information is saved and, when the user views the shortpage at a later time, only the sub-elements of the web page indicated by the user are displayed for viewing by the user. Thus, the user views only preselected sub-elements of the web page. "Combopages" (short for "combination pages") are created by combining shortpages or from combining selections from more than one web page or site. This section discusses an exemplary data processing system used to implement a preferred embodiment of the present invention.

Fig. 1 is a block diagram of data processing elements in accordance with a preferred embodiment of the present invention. Fig. 1 includes a server data processing system 120 communicating with one or more client data processing systems. These client data processing systems include, but are not limited to, a desktop personal computer (PC) 102, a

laptop computer 104, a palm computer (personal computer/assistant or handheld device) 106, a pager 108 (such as an alphanumeric pager), a web-enabled telephone or a cell phone 110, or some other appropriate web-enabled device or appliance 111. A web-enabled telephone or device could use, for example, the WAP (Wireless Application Protocol) or any other appropriate protocol. It should be understood that the client data processing systems shown in Fig. 1 are shown for purposes of example only and are not to be construed in a limiting sense. Any other appropriate type of client can be used in conjunction with the present invention. Fig. 1 also includes a plurality of web page servers 132, 134, 136. Each web page server communicates with server 120 and stores one or more web sites or web pages. Server 120 stores selection information 122 for each user and further stores selection-enabling information 124 that is added to a web page to enable a user to make selections from a web page. Communication can be over a network, such as the internet, an intranet, a wireless network, or in any other appropriate manner.

Fig. 2(a) shows an overview of creation of a shortpage. As shown in Fig. 2(a), during operation, a client 202 sends a request to server 120 for a web page. Server 120 retrieves the web page from an appropriate one of web sites 132-136. The server 120 adds selection-enabling information to the retrieved web page and sends the web page to the client. The client selects sub-elements of the web page and sends that selection information to server 120. Server 120 stores selection information 122 describing the shortpages defined by a user.

Fig. 2(b) shows an overview of viewing a shortpage. The client sends a request for a shortpage (or a combopage) to server 120. Server 120 determines the page or pages needed to view the shortpage or combopage in accordance with the stored selection information and retrieves the page or pages from the web site 132. Server 120 shortens the retrieved web page in accordance with the selection information to form a shortpage and sends the shortpage to the client.

It should be understood that each of the clients, servers, and web servers in the described embodiment includes a processor and a memory. The memory includes instructions capable of being executed by the processor to perform the functions described below. A client and/or a server can also include a computer readable medium for storing the instructions. Server 120 communicates with the clients and the web page servers via any appropriate communication mechanism, including but not limited to a network, an intranet,

the internet, wireless communications, telecommunications, cable modems, and satellite communications.

A client may include browser software suitable for viewing web pages. The browser software can be standalone or integrated within other software products. The functionality can be stored, for example, as a link, a JavaScript, or as a Java applet. Handheld clients contain a specialized browser that receive "snipped" sub-elements of web pages for viewing on a handheld client. Other clients (such as cell phones) do not necessarily contain a browser. It should be understood that references herein to "HTML" can be understood to refer to any appropriate page specification language, such as a hypertext language or a proprietary language.

The following paragraphs describe an example of how a user makes a shortpage. This example is provided for exemplary purposes only and is not to be interpreted in a limiting sense.

Fig. 3(a) shows a display of a "startpage" on a browser in a client. The startpage allows a user to create and edit shortpages and combopages and displays existing shortpages and combopages. Each user has his own startpage. The information needed to make a startpage is preferably stored in server 120. Fig. 3(a) shows a URL 310 of the exemplary startpage for user John Smith

(http://www.shortware.com:9999/UserName=Jsmith&ProcName=StartPage).

The startpage of Fig. 3(a) includes a link to a Notifications page 312, a link to an Edit profile page 314, and a link to a Help page 316. The startpage of Fig. 3(a) allows a user to create, edit, delete, and view shortpages and their options. To create a shortpage, in the described embodiment, the user enters a URL of a page into area 318 and selects "Create Shortpage" button 320. After a shortpage is created, its name will be displayed in Shortpages column 332. An existing shortpage can be viewed ("Go"), edited, options edited, or deleted by selecting the corresponding action in action box 330 and selecting a name of an existing shortpage. Creation, editing and deleting of combo pages are discussed in detail below.

Figs. 3(b)-3(e) are an example of the HTML source code for an exemplary startpage, similar to the StartPage of Fig. 3(a). This source code is included for the purpose of example and is not to be taken in a limiting sense.

Figs. 4(a)-4(c) are flow charts showing how a client and a server interact to perform shortpage operations, such as create, edit, delete, and view. Figs. 4(a) and 4(b) show a method performed by the client. In the described embodiment, the functionality of Figs. 4(a) and 4(b) are implemented via a Java Script executed by the client browser, although any appropriate implementation can be used. Fig. 4(c) shows a method performed by server 120.

In Figs.4(a) and 4(b), the client receives the user's actions (e.g., entering the URL of a web page and clicking "Create shortpage") and determines whether the user wants to create a shortpage (element 410), edit a shortpage (element 420), view a shortpage (element 430), delete a shortpage (element 440), or edit an option (element 450).

If the user wants to create a new shortpage (element 410), the client sends the URL of the page to shorten and a request to create a shortpage to server 120. The client receives a page created from the requested page and from selection-enabling information. In the example, the selection-enabling information allows the user to indicate that sub-elements of the page are shown or hidden. The client then displays the page, and allows the user to create a shortpage as described below. The resulting selection information is sent to server 120. In the described embodiment, selection information is sent to the server each time a page element is marked as "shown" or "hidden." In return, a new preview of the shortpage is sent from the server to the client, so that the preview view of the short page reflects the currently shown/hidden element. The server adds the name of the shortpage to the list of shortpages 332 on the page.

If the user wants to edit a shortpage (element 420), the client sends the URL of the shortpage to edit and a request to edit a shortpage to server 120. The client receives a shortpage created from the original fullpage including selection-enabling information. The selection enabling information includes show/hide buttons and header links. The client then displays the page upon which the shortpage is based, including the selection-enabling information, and allows the user to edit the shortpage as described below. The resulting selection information is sent to server 120. Note that the show/hide buttons can instead be implemented as a one-button user interface, or by using some other appropriate type of user interface that allows the user to choose a subset of the web page elements.

If the user wants to view a shortpage (element 430), the client sends the URL of the shortpage to view and a request to view a shortpage to server 120. The client receives the

shortpage from server 120. The shortpage to be viewed does not include any selection-enabling information. The client then displays the shortpage.

If the user wants to delete a shortpage (element 440), the client sends the URL of the shortpage to delete and a request to delete a shortpage to server 120. Server 120 deletes the shortpage and returns an indication to the client that the shortpage has been deleted. The server removes the name of the shortpage from its list of shortpages 332.

If the client wants to edit options for a shortpage, the client sends the URL of the shortpage and a request to edit the options of the shortpage. The client receives the edit page from server and displays it. The user then edits the options and sends the edits to the server.

Fig. 4(c) shows an overview of an exemplary shortpage method on the server side. When the server receives a request from the client's browser to create, edit, delete, or view a shortpage or option (element 450), the server translates the request into the appropriate request(s) to the web server(s) and retrieves the requested web page(s) or site(s) from the server(s) (element 452). In the described embodiment, these requests are HTTP requests and the web pages are written in HTML or a similar hypertext language. The server does the user-specified action (such as adding selection-enabling information when a shortpage is to be created or edited) or selecting the relevant parts of the web page (when a shortpage is to be viewed) (element 456). For example, the server adds the selection-enabling information to the retrieved web page and sends the resulting page to the client's browser. Table 1 shows an example of Web Procedure Calls (WPCs) used to communicate between the client and the server. The WPC is part of the URL sent by the client and has the format:

/UserName=<username>&ProcName=<procname>{&arg1=val1}{&arg2=val2}...{&arglast=vallast}

where a string in pointed brackets "<" ">" indicates a type of data and a string in curly brackets "{" "}" indicates optional arguments.

II. Creating/Editing a Shortpage

The following paragraphs provide exemplary details of how to create/edit a shortpage. The example shown in based on an exemplary web page shown in Fig. 5(a). The web page shown has a URL of http://abc.gov. In the example, a user visits this web site frequently and desires to select sub-elements of the web site to be placed on a shortpage. If the user desires

to create a shortpage based on the web page of Fig. 5(a), he enters the URL of the web page into address 318 of Fig. 3 and selects "Create Shortpage" button 320. The server will retrieve the requested web page and add selection-enabling information to the page.

Figs. 5(b) and 5(c) show the web page of Fig. 5(a) displayed along with selection-enabling information. The server has broken the web page into blocks, each block having selection-enabling information. In the described embodiment, the selection-enabling information is a pair of show/hide boxes, having a check mark and an "X" respectively. The check mark indicates that the corresponding block will be shown in the shortpage. The "X" indicates that the corresponding block will be hidden (not shown) in the shortpage. Fig. 5(b) shows an editing area 510 and a preview area 520. Each of these areas can be sized and scrolled by the user. Initially all blocks in the page are marked as "hide." The example of Fig. 5(b) shows all blocks marked as "show." Therefore, in the example, preview area 520 shows all blocks in the page. In contrast, in Fig. 5(c), the user has clicked on the "X" box 505, causing the corresponding block 504 to be hidden in the shortpage. Note that the block 504 is not shown in the preview area 520 of Fig. 5(c).

Fig. 5(d) shows the web page of Fig. 5(a) with a different level of block detail. When the user clicks "more details" link 561 of Fig. 5(c), a command is sent to the server and the server re-determines the blocks of the page using a higher level of detail than previously used. (A similar "less detail" button 561' is displayed on the web page of Fig. 5(d)). A method of determining blocks on a page in accordance with a current level of detail is described below in connection with Fig. 9. In Fig. 5(d), for example, the page is broken into fewer blocks. For example, block 504 does not exist in editing area 510.

Fig. 5(e) shows a web page that allows the user to view/edit shortpage properties. The web page of Fig. 5(e) is requested when the user clicks on "Next" link 560, as shown in Figs. 5(b) - 5(d). This page allow the user to enter properties of a shortpage. The user can change the name associated with the shortpage (for example, the name shown in area 332 of Fig. 3) by entering a new name in area 570. The user can enter comments in area 572. The user can indicate that the shortpage does not show the page background in area 574. The user can indicate that changes since the last time the shortpage was viewed should be highlighted on the shortpage in area 576. The user can indicate that the shortpage should be used for similar pages and all URLs starting with a specified string (areas 578 and 580). Other properties

could be included or certain properties shown in the figure excluded without departing from the spirit or scope of the invention. When the user clicks a "Done" button 582, the client sends the entered information to server 120, which stores the entered information in connection with the shortpage.

Fig. 6 is a flow chart showing how the client and the server interact to allow the user to create/edit a shortpage. Each element of the flow chart has a notation next to it indicating whether it is preferably performed by the client, server, or a combination. In element 602, after the server has retrieved a page from a web server, the server needs to break the page down into blocks and to add selection-enabling information to the page for each block. The server uses the SplitPage method (Fig. 8) and the Level of Detail method (Fig. 9) to break the page into blocks. In element 604, the server adds selection-enabling information to the retrieved web page. Specifically, the server adds a "Show" button and a "Hide" button next to the block and puts a border (<table>) around it. The client's browser, thus, displays the web page along with the selection-enabling information for each block.

When the user selects "Show" or "Hide," an HTTP request that uniquely identifies the button is sent to the server (see Table 1). In element 608, the server marks the corresponding block as either "shown" or "hidden" in the representation tree (RepTree) for the shortpage. This information is a part of the selection information stored on the server. In element 610, the server returns a preview of the resulting shortpage to the user, which is displayed in a separate frame (preview area 520). The marked-up RepTree is stored as the template for future references to this shortpage. Thus, the RepTree forms at least part of the selection information. It will be understood that, although the example shows certain actions being performed by the client or the server, other embodiments may implement the client or server to perform actions not shown as being performed by them. For example, the selection information could be stored on the client side.

Fig. 7 shows an example of parsing used by the server to create and edit shortpages. This figure shows the Split Page method. In the example, a page is represented by an HTML file. The HTML is parsed in a manner known to persons of ordinary skill in the art to yield a Representation Tree. The Representation Tree has complex/multipart tags (e.g., <ul>), simple tags (e.g., <img src=Img.gif>), and text nodes (e.g., item1). A simple tag is defined as a tag that has no children and a complex tag is defined as a tag that has children. Server 120

parses the HTML file into a RepTree and iterates down the tree in a depth-first way to mark each node in the tree according to whether it is a single block. The RepTree includes a flag for each block indicating whether it is shown or hidden. A detailed example of the format of a RepTree is shown in Table 2. This format is not to be taken in a limiting sense.

Fig. 8 shows an example of a split page method used to create/edit shortpages. As shown in Fig. 8, if a node corresponds to a simple tag that is an image, input, iframe, or object, it is marked as a single block. If a node corresponds to a complex tag of type <tr> and there are more than two rows or columns in the table, mark the node. If a node corresponds to a complex tag of type <form>, do not mark the node. If a node corresponds to a complex tag of other types, mark the node if it has any text. For other types of nodes, continue traversing the RepTree. For each complex node, walk down the list of its children. Any nodes between two single blocks become one complex block. To avoid creating extra blocks, if a node has only one child block, give the block status to the parent node instead.

Fig. 9 is a flow chart of how to determine a display level when creating shortpages. In the described embodiment, the level of detail is used to decrease the number of blocks displayed at a given time. This flow chart demonstrates how to work with two levels (high and low), but any number of levels can be supported. If the level of detail is low, element 904 determines whether the block's parent has less than L nodes below its children. L can be, for example, 5. If the block's parent has less than L nodes below its children, the block is shown as a separate block when the user creates or edits a shortpage. Otherwise, the block is not shown as a separate block. If the level of detail is high, element 906 determines whether the block has more than K nodes below its children. K can be, for example, 1. If the block has more than K nodes below its children, the block is shown as a separate block when the user creates a shortpage. Otherwise, the block is not shown as a separate block.

Fig. 10 shows the startpage of Fig. 3 after a shortpage has been created based on the web page of Fig. 5(a). Server 120 indicates to the client that a shortpage has been created and adds the name of the shortpage to area 332 of the user's startpage. The startpage having the name of the new shortpage is sent to the browser, where it is displayed.

Fig. 11 shows the shortpage created from the web page of Fig. 5(a). In the example, the user selected certain sub-elements of the page. Specifically, the user indicated that all but a leftmost block of the page is marked as hidden. Thus, the shortpage shows only the non-

hidden block. The shortpage also includes a link to the user's startpage 1102, a link to a notification page 1104, a link to a help page 1106, a link to a page that allows the user to edit a shortpage 1105 and a link to the fullpage 1103 upon which the shortpage is based. Note that the user has indicated that the background of the original page is not to be shown in this shortpage (see Fig. 5(e)).

Fig. 12 shows a fullpage corresponding to the web page of Fig. 11. The fullpage is displayed when the user clicks on the fullpage link 1103 of Fig. 11. In contrast to the shortpage, the original page's background is shown, since it is part of the page. Even though all blocks of the fullpage are shown, the full page is fetched via server 120 and not directly from the web page server. This is shown by the URL of the fullpage: http://shortwave.com:9999/UserName=JSmith/ProcName=B_GetPage&purpose=7& txtURL=http://www.abc.gov .

In this example, the user is "JSmith". The action is to get/fetch a page. "Purpose = 7" indicates that a full page should be fetched. The URL of the full page is http://www.abc.gov. Further example of parameters used to communicate between the client and the server are described in Table 1.

III. Viewing a ShortPage

Fig. 13 is a flow chart showing how the client and server interact to allow the user to view a shortpage. In the described embodiment, the user has selected a name of a shortpage in area 332 and selected "go" in area 330. It should be remembered that, although a shortpage may be based on a particular web page, that web page may have changed since the shortpage was created, either because content may have been changed, added, or deleted. It is necessary to parse the web page on which the shortpage is based (the target) and determine whether the blocks marked "show" in the template are still present in the target. The target page on which the shortpage is based is retrieved and parsed into a RepTree by the server. Each shortpage has a RepTree associated with it.

In element 1304, the server performs a "double traverse" method, recursively traversing down both the template and the target RepTrees, trying to match the nodes. If two nodes match by type and tag, assign the "Show" or "Hide" flags of the template node to the target node. If there is no match, start to look for the closest match. If, for example, we are

currently on nodes Temp[I], Targ[J], then we are looking for matching Temp[K] and Targ[L] such that, for K and L, K-I+L-J is the smallest possible value.

After element 1308, any template nodes that are not matched were the nodes that have disappeared from the page. Any target nodes that were not matched were the nodes that have been added to the page. All target nodes with "Show" flags (i.e., all target blocks that matched a block in the template) are part of the shortpage. These blocks are sent to the requesting client. Other appropriate matching methods can also be used.

In the described embodiment, the user can enter the address of a web page to be shortened. For example, the user can enter a URL in area 318 and click on button 340. If the user has previously defined a shortpage for this URL or for a URL on this web site, the shortpage is displayed. Similarly, if a page has a link to another page within it and the link is selected, server 120 will check the new link to determine whether it is a shortpage.

Fig. 14 is a flow chart showing details of determining whether a URL is the URL of a shortpage. As described in element 1402, this method will be used when, instead of requesting a specific shortpage, the user enters or browses to a particular URL. In element 1404, for each shortpage that the user has, server 120 compares the URL, host name, document name, and CGI argument lists. The server does this for both a shortpage requested address and for the actual address. The requested address and the actual address may be different because of HTTP redirection.

If, in element 1406, the host name, document, name, and CGI parameter names match, it is a "clear match." If a clear match occurs, use this shortpage for customizing the request. If a clear match does not occur, control passes to element 1410. In element 1410, for each "approximate match" (which is defined as host name and document name match), calculate "match ranking." Step 1412 calculates match ranking as follows. For each matching RepNode of RepTree, add (1/(Node depth)) to the rank. For each mismatch, subtract the same amount. In step 1414, select the shortpage with the highest matching rank for customizing this request. If no match occurs, then show the full page.

IV. Creating/Editing/Viewing a Combopage

A described embodiment of the present invention allows the user to define a "combination page" (also called a "combopage"). A combopage is a page made up of more

than one web page. In the described embodiment, a combopage is made up of a combination of shortpages. Other combopages are made up of information from more than one web page, but not necessarily from other shortpages.

i. Standard Combopages

Fig. 15(a) shows a display for creating a combopage. In the example provided, combopages are created by combining shortpages. Combopages can also be created in a manner similar to that of shortpages without explicitly creating shortpages first. The display of Fig. 15(a) is displayed by a browser of a client. An area 1502 contains the names of all shortpages created by the user. Selected shortpage area 1504 contains the names of all shortpages selected by the user to be in the combopage. In the example, no shortpages have been selected yet.

Arrow buttons 1506 cause a shortpage name to be added to or removed from area 1504. Each time the user clicks on one of buttons 1506, a message is sent to server 120, which returns a redrawn page and stores the change to the combopage. Up and Down buttons 1508 allow the user to change the position of a shortpage within a combopage. Each time the user clicks on one of buttons 1508, a message is sent to server 120, which returns a redrawn page and stores the change in position of the elements in the combopage.

Fig. 15(b) shows an example of a combopage. In the example, the combopage is made up of two short pages: a first shortpage 1552 and a second shortpage 1554. The combopage also includes a link to the user's startpage, a help link, and a link to the edit page (see Fig. 16(c)). It should be noted that the shortpages used to make the combopage can be from the same site or from different sites.

Fig. 16(a) is a flow chart for creating a combopage using the display of Fig. 15(a). Element 1602 waits for the user to select the shortpages for the combopage and to position the shortpages on the combopage. Element 1604 stores the identities of the user-selected shortpages and their positions.

Fig. 16(b) is a flow chart of a method performed by server 120 to display a previously created combopage. Element 1652 receives a request for a combopage from a user. For each shortpage that is part of the combopage, the server sends a request to the corresponding web site server. In element 1656, the server waits until all the requests come back from the web

site servers or a time-out expires. In element 1658, the server creates an HTML table for the combopage and, in element 1650, sends the resulting HTML to the client.

Fig. 16(c) shows a web page that allows the user to view/edit combopage properties. The web page of Fig. 16(c) is preferably requested when the user clicks on "Next" link 1508, as shown in Fig. 15(a). The user can change the name associated with the combopage by entering a new name in area 590. The user can indicate that the contents of the combopage are to be enclosed in an HTML table in area 592. When the user clicks a "Done" button 582, the client sends the entered information to server 120, which stores the entered information in connection with the combopage and returns the user to the user's startpage.

ii. Parameterized Combopages

The following paragraphs discuss a specialized type of combopage called a "parameterized combopage." A parameterized combopage is similar to a regular combopage, but it saves the user from having to type in the same parameter more than once. A parameterized combopage is created as shown in the flow chart of Fig. 18(a).

As shown in element 1802 of Fig. 18(a), after the user has selected shortpages having CGI parameters and entered CGI parameters on at least two shortpages, the server compares the CGI parameters for the URLs. If there is a CGI parameter which appears in all CGI requests, the server determines that the combopage is a parameterized combopage. In element 18081, the server marks the common CGI parameter as a special combopage parameter and stores an indication that this combopage is a parameterized combopage. Thus, in the described embodiment, the server, not the user, determines that the combopage is parameterized. Although the invention is described in connection with CGI parameters, other types of parameters can be used.

Fig. 17(a) shows a display for viewing a previously created parameterized combopage. When a user indicates that he wants to view a combopage that has been determined to be parameterized (see Fig. 3(a)), the server sends a prompt 1702 for the user to enter a parameter value. In the example, the user has entered a parameter value of "ABC"

Fig. 18(b) is a flow chart for displaying a parameterized combopage. As shown in element 1852, the server receives the request for the combopage from the user and determines that the requested page is a parameterized combopage, based on the stored indication from

element 1808. The server asks the user to enter the parameter value (see Fig. 17(a)). In each URL of the shortpages making up the combopage, the server replaces the original value of the parameter by the one entered by the user. The server then sends the HTML for the parameterized combopage to the client for display.

Fig. 17(b) shows an example of a parameterized combopage. In the example, the combopage is made up of three shortpages 1752, 1754, and 1756, each having an associated CGI parameter. Here, the user has entered a value of "ABC" in the prompt of Fig. 17(a). The server fills in the CGI parameters for each of the three pages upon which the shortpages are based and retrieves the pages from their respective web site servers. The server then takes the sub-elements of the three pages that form the shortpages and combines them to form the combopage. Thus, the user enters the parameter value "ABC" only one time, but the parameterized combopage contains information from three different sources relating to "ABC".

Fig.17(c) shows another example of a parameterized combopage. In this example, no separate page is required for entry of a parameter. Instead, an area 1772 allows the user to enter a parameter value 1771 (here the user has entered "abc, Inc."). The shortpages (or sub-elements of web pages) making up the parameterized combo page are retrieved as described above and the parameterized combo page is completed and sent to the client where it is displayed as shown in Fig. 17(c). In this example, the user has entered the parameter "abc, Inc.". This parameter is sent as a parameter to the pages used to make the combopage and the resulting shortpages, which preferably have information about the parameter abc, Inc. are created and used to make the parameterized combopage. Thus, in the example, shortpage 1774 contains information about the parent company of abc, Inc. while shortpage 1776 contains information about the stock price of abc, Inc. If the user enters a different parameter, the types of information on the combopage remain constant, but the company described changes in accordance with the parameter.

V. Handheld client

As discussed in connection with Fig. 1, the present invention can be implemented for a wide variety of clients. Fig. 20 is a block diagram of data flow when a shortpage or a combopage is viewed on a personal digital assistant, such as a Palm VII Personal Digital

Assistant (Available from 3Com Corporation) or a similar handheld device. PDAs often use a "web clipping" system to view web pages. The PDA views predefined web clippings by sending a request for the clipped pages to a proxy server.

Initially, a "web clipping" application, which contains a single link to the user's startpage is created and downloaded into the user's handheld device. The user creates his shortpages and combopages as described above. Preferably, these shortpages and combopages are created on the user's PC, although other embodiments may allow the user to create them on the handheld.

To view a shortpage or a combopage, the user simply goes to his startpage "web clipping" in the handheld and selects a link to the shortpage. As shown in Fig. 20, this action causes a request to be sent to the proxy server 2004, which passes the request to the shortpage server 2006, which forwards the request to the web site 2008 hosting the full page (or full pages in the case of a combopage). The web site returns the requested page(s) to the shortpage server 2006, which creates a shortpage or a combopage as described above and which then passes the created shortpage or combopage to the proxy server 2004. The proxy server sends the shortpage or combo page to the handheld client 2002.

Fig. 19 is a flow chart for viewing a shortpage when the client is a personal digital assistant. In element 1902, a web clipping short page application, which contains a single link to the user's startpage is created and downloaded into the user's PDA. In element 1904, the user creates his shortpage (or combopage) as before, using his PC or similar device. In element 1906, to view a shortpage or combopage, the user simply goes to his startpage "web clipping" and selects a link to the shortpage. In element 1908, the request goes through a proxy server (such as palm.net of 3Com) and is forwarded to the site hosting the page or pages. In element 1910, the response from the web server is customized by the Shortpage server and goes back to the user.

In the described embodiment, the shortpage server creates a modified version of a shortpage when it knows that the client is a handheld device. For example, the shortpage server removes large graphic files and Java Script code. Other embodiments may make other modifications or no modifications, depending on the nature and capabilities of the handheld client. In the described embodiment, the proxy server also modifies the page somewhat before sending the page to the handheld client.

VI. Shared Portal

Fig. 21 is a display of a shared portal shortpage application. A shared portal is created by one or more persons and is viewable by multiple persons. Different users may have different access permissions stored within the server. For example, in one embodiment, a single user has permissions to create folders (such as folder 2102), but any user can add shortpages within folders (link 2104 is a link to a combopage titled "Bay Area News"). As another example, only a single user can add folders and links, but any user can access the shortpages and combopages. In a shared portal, whenever a user attempts to edit or create a shortpage or combopage, the server first checks the permissions of the user. The user may be required to enter a password and/or to Log on from an approved machine. Similarly, whenever a user attempts to access a shortpage or a combopage, the server checks the permissions of the user to determine whether the user is authorized to access the page he has requested. A shared portals may be open to all users or may be restricted to certain groups, such as families, employees of a company, employees of a department, or clubs.

VII. Cluster Implementation

In one embodiment of the present invention, server 120 resides on a number of nodes, which are dual-Pentium Windows NT PCs. In this implementation, data is stored in a shared RAID file server. A hardware load-balancer, such as a Big/IP load balancer from FS Networks, Inc. of Seattle, Washington is used to route user requests to the least busy node. Such an implementation uses persistent connections with, for example, a ten minute timeout to ensure that the requests from the same address get to the same server. When the first request for the given user comes to the given server, the user's data is read from the file server. If there is no activity for the time Q (for example, Q>T, 12 minutes), the data for the user is cleared from memory.

While the invention has been described in conjunction with a specific embodiment, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. For example, in one embodiment, shortpages and/or combopages are pre-created and offered to third persons who want specialized information or who want shorter web pages. In another embodiment, shortpages

can be located on a combopage next to each other in a horizontal direction. Accordingly, it is intended to embrace all such alternatives, modifications and variations as fall within the spirit and scope of the appended claims and equivalents.

Table 1 (Page 1 of 1)

WPCs - Web Procedure Call list

All WPCs take a username.

// The WPC consists of: (without "<" or ">")
//
/Username=<username>&ProcName=<procname>&arg1=val1&arg2=val2&...&argLast=val Last
// (The number of args is variable, and the "last" arg is optional).

// New user registration and user login.
NewUserLogin - Allows the user to enter registration information
RegisterUser - Submits username, full name, password, email, and other info for a new user.
LoginUser - login user. Takes username and password

// Wizard Action
WizardAction - takes object (shortpage, notification, or combopage) id
- Edit - start editing the object
- Props - Displays properties of the object
- CreateShortpage - creates a shortpage
- CreateNotification - creates a notification
- CreateCombopage - creates a combopage
- Browse - browse to the given URL
- Go - go to the given shortpage/combopage
- Delete - delete given object
- Next - present logically the next screen in the wizard
- Done - done with the editing
- Cancel - cancel editing

B_GetPage - Get a page. Takes a URL
B_GetPageS - Same, but the request came through a script, URL needs some massaging. Takes a URL and a base URL for the page to be appended to it.
StartPage - show Start Page for the user
NotifPage - Show notification page for the user
U_DeleteNotifs - delete certain notification messages. Takes message ids.
P_SelectionFrame - Displays the selection frame (upper frame) for the shortpage creation
P_DoCommand - do editing command, such as "Show" block, or "Hide" block.
Takes block id as a parameter, and command id ("Show", "Hide", "Notify", etc.)

ProfileMgrAction - Edit profile settings

Table 2 (Page 1 of 2)

```
typedef CArray<CRepNode*, CRepNode*> CRepNodeArray;

class CRepNode
{
        friend class CRepBuilder;
public:
        CRepNode(CRepNode *pParent=NULL, int iIndex=0);
        virtual ~CRepNode();

        void AddChild(CRepNode *pChild);
        void InsertChild(CRepNode *pChild, int iIndex);

        void Serialize(CMyArchive& ar);

        enum Type{
                NONE,
                TEXT,
                SIMPLE_TAG,
                CONTAINER_TAG,
                COMMENT,
                BADTAG,   // bad closing tag.
                SCRIPT,   // script node contains both <SCRIPT> and </SCRIPT>
                WHITESPACE,//  whatever "trims" to an empty string.
                BAD_CLOSING
        };

        Type m_Type;

#define FLG_BLOCK_BEGIN  0x1
#define FLG_BLOCK_END  0x2

#define FLG_BLOCK_MASK  (FLG_BLOCK_BEGIN | FLG_BLOCK_END)

#define FLG_HIDE            0x10 // hide this node.
#define FLG_CHANGED             0x20 // node has changed
#define FLG_NOMATCH             0x40 // couldn't match this node.
#define FLG_SHOW            0x80 // show the node and subnodes.

#define FLG_NOTIFY              0x100 // Notify on this node.
#define FLG_BADLY_CLOSED 0x200 // This node is incorrectly nested.
#define FLG_TEMP            0xf000 // The mask for temp bits used by stuff
                                                        // here and there for a short time.
```

Table 2 (Page 2 of 2)

```
        ULONG m_Flags;
```

```
        CNodeInfo *m_pInfo;  // any data can be stored here.
                             // not saved to the disk!

        CNotifyInfo *m_pNotify; // Notification info on this node.
                                // must be serialized.

        // has either the text, or a simple tag or
        // the full tag with params, but without nested tags.. Example:
        // "<TD WIDTH=117 VALIGN=TOP ALIGN=LEFT>"
        CString m_Text;

        // Children of a complex tag.
        CRepNodeArray m_aKids;


        // the following two fields are redundant for all known (to our
        // program) tags.

        TAG m_Tag;
        // The tag without params and < or >, like "TD"
        // Note that there is never a closing tag, like </TD> in the representation.
        // If the type of the node is CONTAINER_TAG, then it is assumed that
        // there is a closing tag after all m_aKids.
        CString m_TagName;

        CString m_NodeHeader;

        CRepNode *GetParent() { return m_pParent; }
        int GetIndex() { return m_Index; }

        CRepNode *m_pParent;  // root object has this NULL
        int m_Index;    // index into the array of the parent node.

#if DEBUG
        void AssertValid(); // CObject-like validation function.
#endif
};
```

WHAT IS CLAIMED IS:

1. A method for creating a combination web page, comprising:

allowing a user to choose a subset of elements, some of which appear on a first web page and some of which appear on a second web page;

saving the user's choices; and

creating a combination web page that is based on the first web page and the second web page, and includes the elements chosen by the user in accordance with the user's saved choices.

2. The method of claim 1, wherein creating a combination web page includes:

retrieving current versions of the first web page and the second web page;

selecting the user's chosen elements from the current version of the first and second web pages; and

creating the combination web page that includes the chosen elements.

3. The method of claim 1, wherein the combination web page includes only the chosen elements.

4. The method of claim 1, wherein allowing the user to choose a subset of elements includes:

adding selection-enabling information to the first and second web pages;

sending the first and second web pages including the selection-enabling information to the user's browser; and

receiving an indication that the user has selected at least one element of the first and one element of the second web page.

5. The method of claim 1, wherein the combination web page is displayed on a client system.

6. The method of claim 5, wherein the client system is a personal computer.

7. The method of claim 5, wherein the client system is a personal digital assistant device.

8. The method of claim 5, wherein the client system is a cellular telephone having a display.

9. The method of claim 5, wherein the client system is an alphanumeric paging device.

10. The method of claim 5, wherein the client system is a web-enabled device.

11. The method of claim 1, wherein the user first forms short web pages and combines the short web pages to form the combination web page.

12. The method of claim 1, wherein at least one of the first and second web pages is a world wide web page.

13. The method of claim 1, wherein at least one of the first and second web pages is specified in a hypertext markup language.

14. A method for creating a combination web page, comprising:

storing in a memory selection information specifying the elements on a combination web page, the combination web page being based on at least two original web pages;

retrieving the original web pages upon which the combination web page is based; and

creating the combination web page from elements on the original web pages in accordance with the selection information.

15. The method of claim 14, wherein the combination web page is displayed on a client system.

16. The method of claim 15, wherein the client system is a personal computer.

17. The method of claim 15, wherein the client system is a personal digital assistant device.

18. The method of claim 15, wherein the client system is a cellular telephone.

19. The method of claim 15, wherein the client system is an alphanumeric paging device.

20. The method of claim 15, wherein the client system is a web-enabled device.

21. The method of claim 14, wherein the user first creates short pages and then combines the short pages to form the combination web page.

22. The method of claim 14, wherein at least one of the first and second web pages is a world wide web page.

23. The method of claim 14, wherein at least one of the first and second web pages is specified in a hypertext markup language.

24. A computer-implemented method performed by a server data processing system, comprising:

receiving, from a client, a request for multiple web pages;

retrieving the multiple web pages;

sending the requested multiple web pages to the client;

receiving, from the client, selection information for the requested multiple web pages, the selection information indicating a subset of the information of the web pages that is smaller than the set of all information on the web pages; and

storing the selection information in the server data processing system.

25. The method of claim 24, further comprising, by the server data processing system:

splitting the retrieved web pages into page elements, by the server data processing system; and

creating a new version of the retrieved web pages, the new version of the web pages including selection-enabling information,

wherein sending the requested web pages to the client includes sending the new version of the retrieved web pages that includes the selection-enabling information.

26. The method of claim 24,

wherein the requested web pages sent to the client do not include selection-enabling information, and

wherein the selection-enabling information is added to the retrieved web pages by the client.

27. A computer-implemented method performed by a server data processing system, comprising:

receiving, from a client, a request for a user's combination web page;

retrieving at least two web pages upon which the user's combination web page is based;

selecting portions of the retrieved web pages in accordance with selection information of the user stored in the server data processing system; and

sending the user's combination page, containing the selected portions of the retrieved web page to the user.

28. The method of claim 27, wherein the selection information indicates whether portions of the retrieved web pages are shown or hidden in the shortpage.

29. The method of claim 27, wherein receiving a request for a user's combination web page is performed at initialization of the user's browser.

30. The method of claim 27, further comprising:

first allowing the user to create at least two short pages and then allowing the user to combine the short pages to form a combination web page.

31. A computer-implemented method performed by a client data processing system, comprising:

sending, by a client, a request for at least two web pages;

receiving the requested web pages;

allowing the user to select portions of the received web pages as being hidden or shown, the hidden portions being indicated by selection information; and

sending, to a server, the selection information for a combination web page formed by the at least two web pages.

32. The method of claim 31, further comprising:

receiving at least two web page that are split into page elements, each page element having a selection-enabling information associated therewith; and

receiving input from a user selecting at least one page element of each of the web pages to yield selection information; and

sending the selection information to a server.

33. The method of claim 1, wherein the shared combination web page is a shared portal web page accessible by more than one user.

34. The method of claim 12, wherein the shared combination web page is a shared portal web page accessible by more than one user.

35. The method of claim 20, wherein the shared combination web page is a shared portal web page accessible by more than one user.

36. The method of claim 23, wherein the shared combination web page is a shared portal web page accessible by more than one user.

37. The method of claim 27, wherein the shared combination web page is a shared portal web page accessible by more than one user.

38. An apparatus that creates a combination web page, comprising:

software portions configured to allow a user to choose a subset of elements, some of which appear on a first web page and some of which appear on a second web page;

software portions configured to save the user's choices; and

software portions configured to create a combination web page that is based on the first web page and the second web page, and includes the elements chosen by the user in accordance with the user's saved choices.

39. The apparatus of claim 38, wherein the user first forms short web pages and the apparatus combines the short web pages to form the combination web page.

40. An apparatus that creates a combination web page, comprising:

software portions configured to store in a memory selection information specifying the elements on a combination web page, the combination web page being based on at least two original web pages;

software portions configured to retrieve the original web pages upon which the combination web page is based; and

software portions configured to create the combination web page from elements on the original web pages in accordance with the selection information.

41. The apparatus of claim 40, wherein the user first creates short pages and then the apparatus combines the short pages to form the combination web page.

42. A server apparatus, comprising:

software portions configured to receive, from a client, a request for multiple web pages;

software portions configured to retrieve the multiple web pages;

software portions configured to send the requested multiple web pages to the client;

software portions configured to receive, from the client, selection information for the requested multiple web pages, the selection information indicating a subset of the information of the web pages that is smaller than the set of all information on the web pages; and

software portions configured to store the selection information in the server data processing system.

43. The apparatus of claim 42, further comprising:

software portions configured to split the retrieved web pages into page elements, by the server data processing system; and

software portions configured to create a new version of the retrieved web pages, the new version of the web pages including selection-enabling information,

wherein sending the requested web pages to the client includes sending the new version of the retrieved web pages that includes the selection-enabling information.

44. A server apparatus, comprising:

software portions configured to receive, from a client, a request for a user's combination web page;

software portions configured to retrieve at least two web pages upon which the user's combination web page is based;

software portions configured to select portions of the retrieved web pages in accordance with selection information of the user stored in the server data processing system; and

software portions configured to send the user's combination page, containing the selected portions of the retrieved web page to the user.

45. A computer program product, comprising:

a computer readable medium having computer executable instructions thereon that create a combination web page, including:

computer program code devices configured to allow a user to choose a subset of elements, some of which appear on a first web page and some of which appear on a second web page;

computer program code devices configured to save the user's choices; and

computer program code devices configured to create a combination web page that is based on the first web page and the second web page, and includes the elements chosen by the user in accordance with the user's saved choices.

46. A computer program product, comprising:

a computer readable medium having computer executable instructions thereon that create a combination web page, including:

computer program code devices configured to receive, from a client, a request for multiple web pages;

computer program code devices configured to retrieve the multiple web pages;

computer program code devices configured to send the requested multiple web pages to the client;

computer program code devices configured to receive, from the client, selection information for the requested multiple web pages, the selection information indicating a subset of the information of the web pages that is smaller than the set of all information on the web pages; and

computer program code devices configured to store the selection information in the server data processing system.

47. A computer program product, comprising:

a computer readable medium having computer executable instructions thereon that form a combination web page, including:

computer program code devices configured to receive, from a client, a request for a user's combination web page;

computer program code devices configured to retrieve at least two web pages upon which the user's combination web page is based;

computer program code devices configured to select portions of the retrieved web pages in accordance with selection information of the user stored in the server data processing system; and

computer program code devices configured to send the user's combination page, containing the selected portions of the retrieved web page to the user.

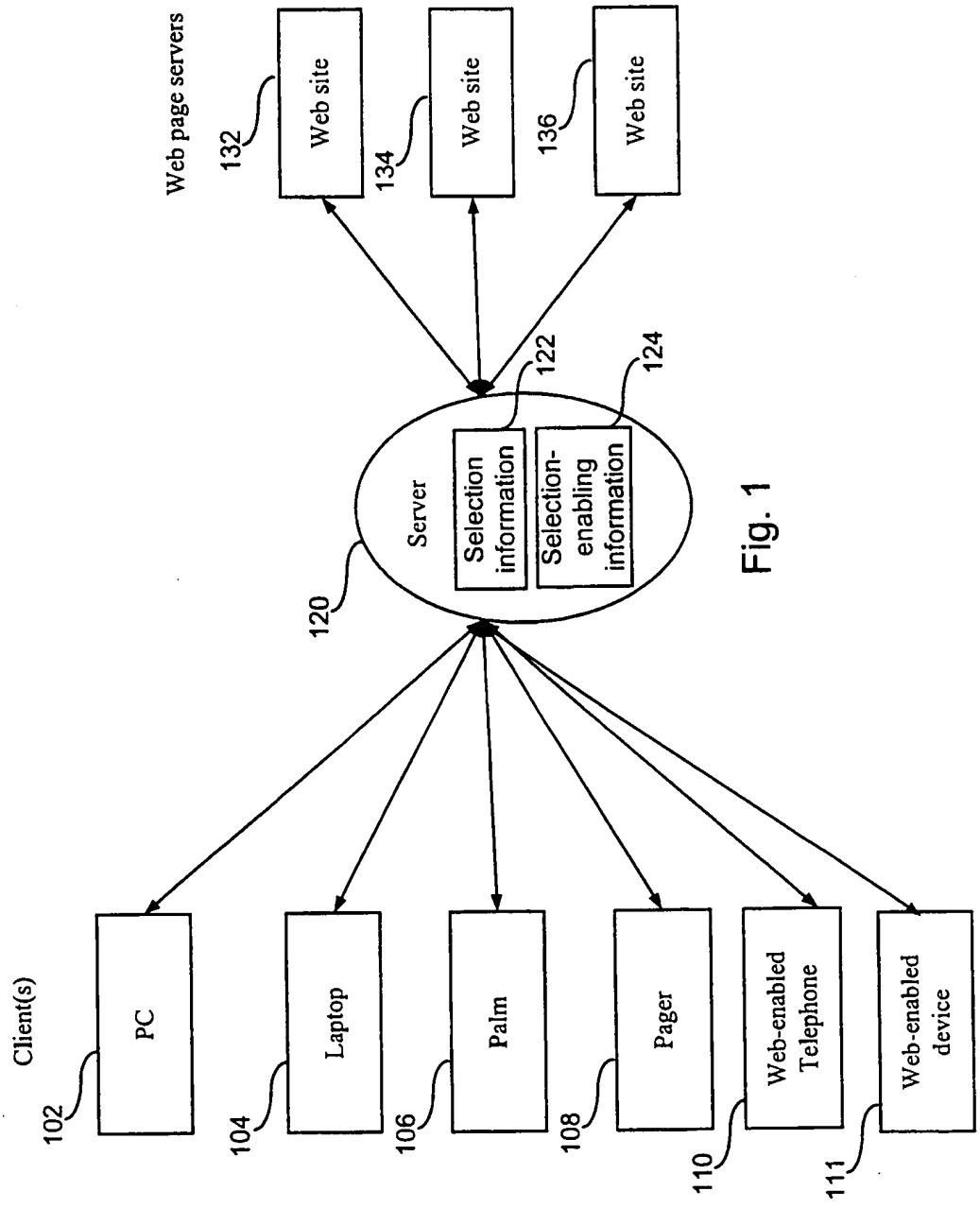

Web page servers
132
Web site
134
Web site
136
Web site
122
124
Server
Selection information
Selection-enabling information
120
Client(s)
102
PC
104
Laptop
106
Palm
108
Pager
110
Web-enabled Telephone
111
Web-enabled device

Fig. 1

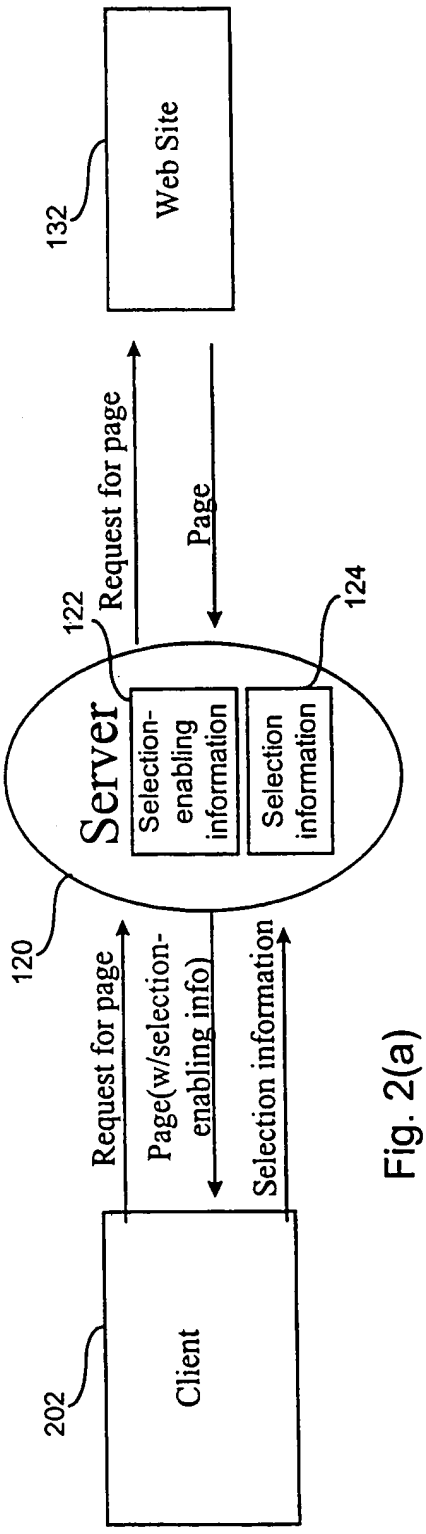


Fig. 2(a)
Creating a ShortPage

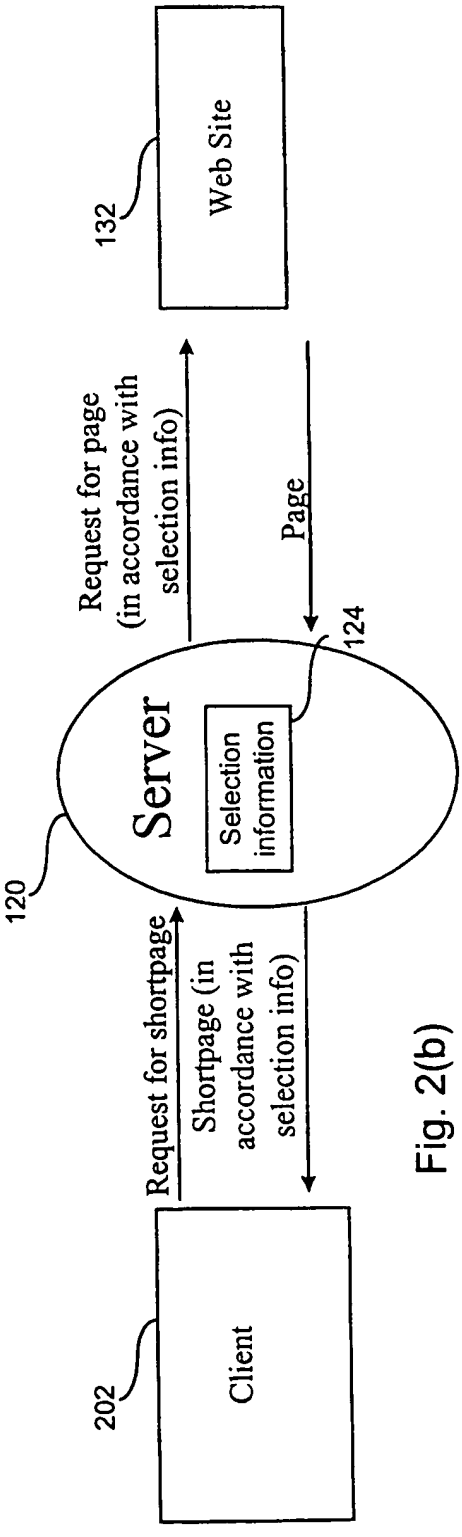


Fig. 2(b)
Viewing a ShortPage

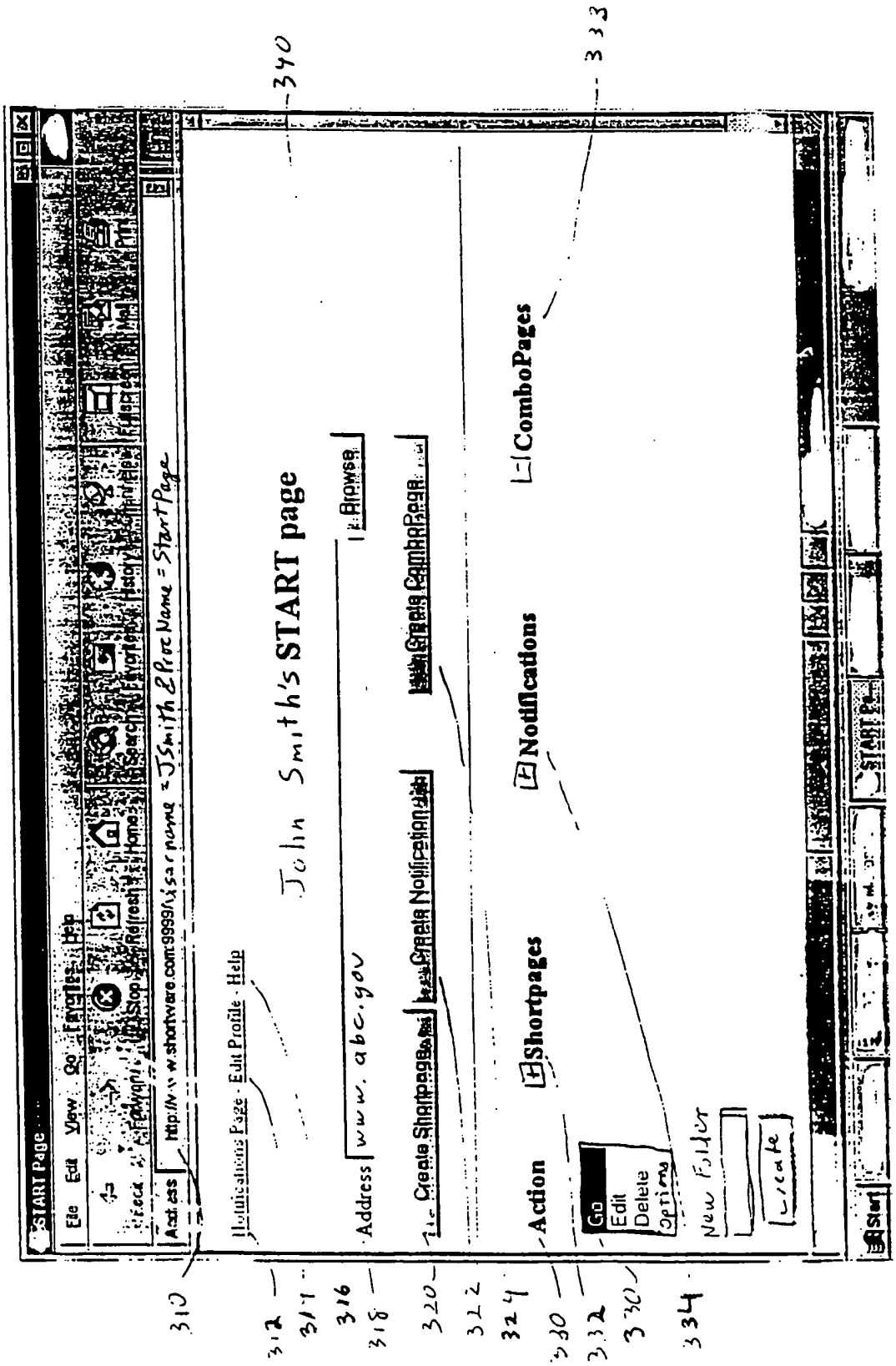


Fig. 3(a)
Before Creating a Shortpage

```
<html>

<head>
<title>START Page</title>
</head>
<script Language="JavaScript"> function ButtonClicked(buttonName)
 {
 if(document.main_form.txtURL.value == '')
 {
 alert('Please enter a URL.');
 return false;
 }
 else
 {
 document.main_form.btnAction.value = buttonName;
 return true;
 }
 }
 </script>


<body>
<font size="-1" color="#2244ff">

<p><font size="-1"><A href="http://shortpage.com:9999/UserName=lma
jerus&ProcName=NotifPage" target="_top"><font color="#2244ff">Noti
fications Page</font></A> - <A href="http://shortpage.com:9999/Use
rName=lmajerus&ProcName=START_P" target="_top"><font color="#2244f
f">Edit Profile</font></A> - <A href="http://shortpage.com:9999/Us
erName=lmajerus&ProcName=HelpPage&Index=3&Browser=1" target="_top"><fo
nt color="#2244ff">Help</font></A></font>
<!-- END OF NAVIGATION BAR -->

</font> </p>

<h2 align="center">lmajerus's START page</h2>
<font size="-1" color="#0000FF">

<p></font></p>

<form action="http://shortpage.com:9999/UserName=lmajerus&ProcName
=WizardAction&Place=Start" method="POST" name="main_form"
onSubmit="if(txtURL.value == ''){        alert('Please enter a URL.
```

Fig 3(b)

```
');     return false;}else if(btnAction.value == 'invalid'){    bt
nAction.value = 'Browse';       return true;}">
  <input type="hidden" name="btnAction" value="invalid"><p>Address
 <input type="text"
  size="60" name="txtURL" value>  <input type="submit" name="
btn1" value="Browse"
  onClick="return ButtonClicked('Browse');"></p>
  <p><input type="submit" name="btn" value="Create Shortpage"
  onClick="return ButtonClicked('Create Shortpage');"> <input type
="submit" name="btn"
  value="Create Notification" onClick="return ButtonClicked('Creat
e Notification');">
           &nbs
p; <input
  type="submit" name="btn" value="Create ComboPage"
  onClick="btnAction.value = &quot;Create ComboPage&quot;; submit(
); return false;"> </p>
  <hr>
</form>
<script Language="JavaScript">
function DoAction(type, id)
 {
 if(document.second_form.btnAction[document.second_form.btnAction.
selectedIndex].value == 'Delete')
 {
  doDelete = confirm('Delete this ' + type + '?');
  if(doDelete)
  {
   document.second_form.txtID.value = id;
   document.second_form.submit();
  }
 }
 else
 {
  document.second_form.txtID.value = id;
  document.second_form.submit();
 }
 return false;
 }
 </script>


<form action="http://shortpage.com:9999/UserName=lmajerus&ProcName
```

Fig. 3(c)

```
=WizardAction&Place=Start" method="GET" name="second_form">
  <input type="hidden" name="txtID" value><table width="100%">
    <tr valign="top">
      <td width="16%"><h3>Action</h3>
      <p><select name="btnAction" size="4">
        <option value="Go" selected>Go</option>
        <option value="Edit">Edit</option>
        <option value="Options">Options</option>
        <option value="Delete">Delete</option>
      </select><!-- This is not a button but using the same name m
akes things very convenient --><br>
      </p>
      <p>New Folder:<br>
      <input type="text" name="NewFolderName" size="9"> <br>
      <input type="submit" value="Create!" name="btnNewFolder"></p
>
      <p> </td>
      <td width="84%"><table width=100%><tr valign=top>
<td width=33%><a href=http://shortpage.com:9999/UserName=lmajerus&
ProcName=FolderOp&OpCode=Collapse&FolderID=116761&LoopBack=http%3A
%2F%2Fshortpage.com%3A9999%2FUserName%3Dlmajerus%26ProcName%3DStar
tPage><img src=http://www.shortware.com/images/minus_button.gif bo
rder=0></a><big><font color="#009900">ShortPages</font></big><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89115" onClick='return DoAction("ShortPage", 89115);'>
<font color="#2244ff">www.uspto.gov</font></A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89117" onClick='return DoAction("ShortPage", 89117);'>
<font color="#2244ff">www.uspto.gov/cgi-bin/phone/ptophone</font><
/A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_G
tPagelet&ID=89126" onClick='return DoAction("ShortPage", 89126);'>
<font color="#2244ff">164.195.100.11/netahtml/search-bool.html</fo
nt></A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89128" onClick='return DoAction("ShortPage", 89128);'>
<font color="#2244ff">www.uspto.gov</font></A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89129" onClick='return DoAction("ShortPage", 89129);'>
<font color="#2244ff">www.uspto.gov</font></A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89130" onClick='return DoAction("ShortPage", 89130);'>
<font color="#2244ff">www.uspto.gov</font></A><BR>
```

Fig. 3(d)

```
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89133" onClick='return DoAction("ShortPage", 89133);'>
<font color="#2244ff">www.optipat.com</font></A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=111525" onClick='return DoAction("ShortPage", 111525);
'><font color="#2244ff">www.uspto.gov</font></A><BR>
<BR>
<a href=http://shortpage.com:9999/UserName=lmajerus&ProcName=Folde
rOp&OpCode=Expand&FolderID=116765&LoopBack=http%3A%2F%2Fshortpage.
com%3A9999%2FUserName%3Dlmajerus%26ProcName%3DStartPage><img src=h
ttp://www.shortware.com/images/add_button.gif border=0></a><big><f
ont color="#009900">test</font></big><BR>
<BR>
</td>
<td width=33%><a href=http://shortpage.com:9999/UserName=lmajerus&
ProcName=FolderOp&OpCode=Collapse&FolderID=116762&LoopBack=http%3A
%2F%2Fshortpage.com%3A9999%2FUserName%3Dlmajerus%26ProcName%3DStar
tPage><img src=http://www.shortware.com/images/minus_button.gif bo
rder=0></a><big><font color="#009900">ComboPages</font></big><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89118" onClick='return DoAction("ComboPage", 89118);'>
<font color="#2244ff">ComboPage #1</font></A><BR>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=103560" onClick='return DoAction("ComboPage", 103560);
'><font color="#2244ff"></font></A><BR>
<BR>
</td>
<td width=33%><a href=http://shortpage.com:9999/UserName=lmajerus&
ProcName=FolderOp&OpCode=Collapse&FolderID=116763&LoopBack=http%3A
%2F%2Fshortpage.com%3A9999%2FUserName%3Dlmajerus%26ProcName%3DStar
tPage><img src=http://www.shortware.com/images/minus_button.gif bo
rder=0></a><big><font color="#009900">Notifications</font></big><B
R>
<A href="http://shortpage.com:9999/UserName=lmajerus&ProcName=P_Ge
tPagelet&ID=89111" onClick='return DoAction("Notification", 89111)
;'><font color="#2244ff">www.uspto.gov</font></A><BR>
<BR>
</td>
</tr></table>
</td>
    </tr>
  </table>
</form>
</body>
</html>
```

Fig 3(c)

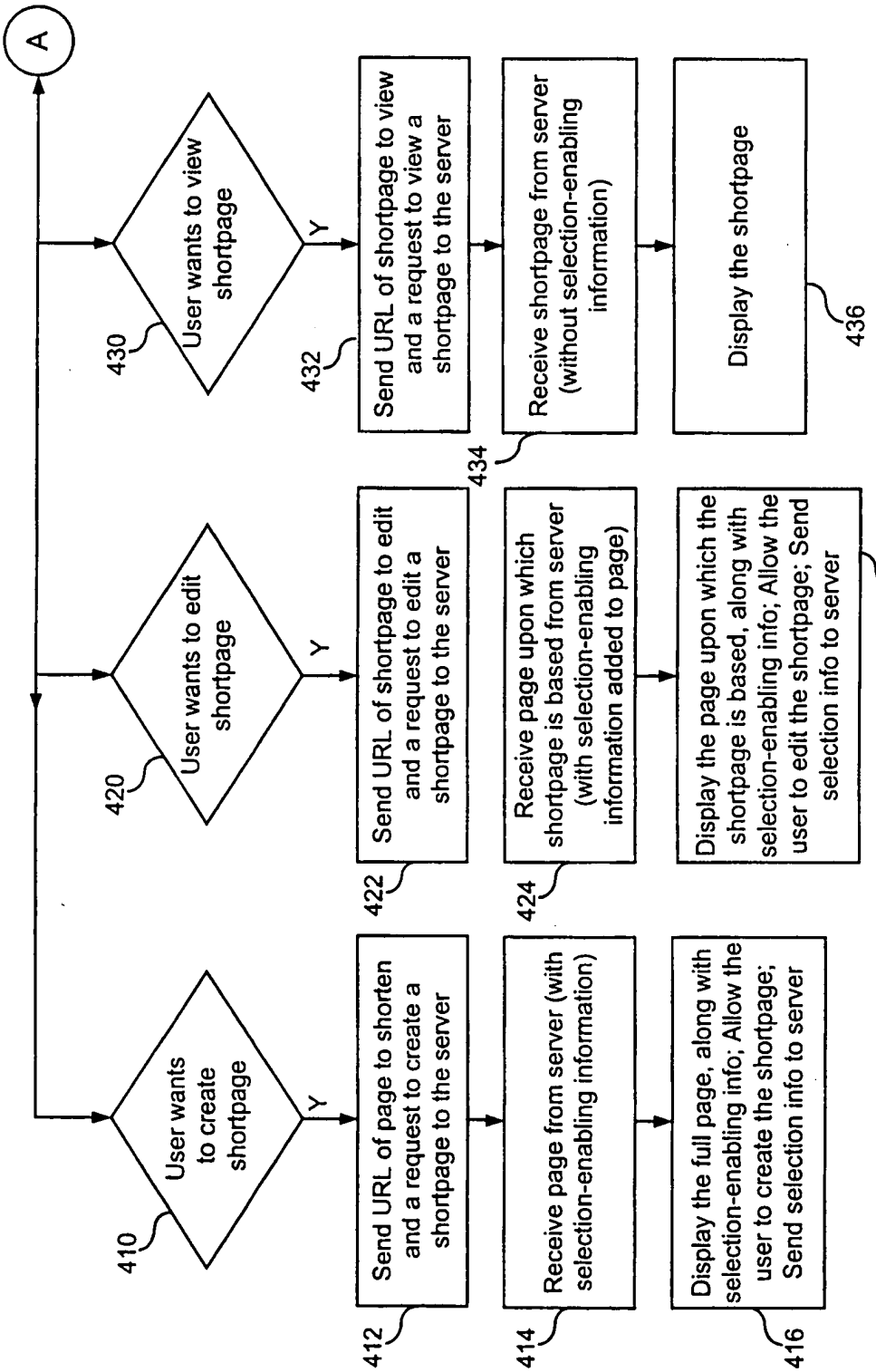


Fig. 4(a)
Shortpage Operations (client side)

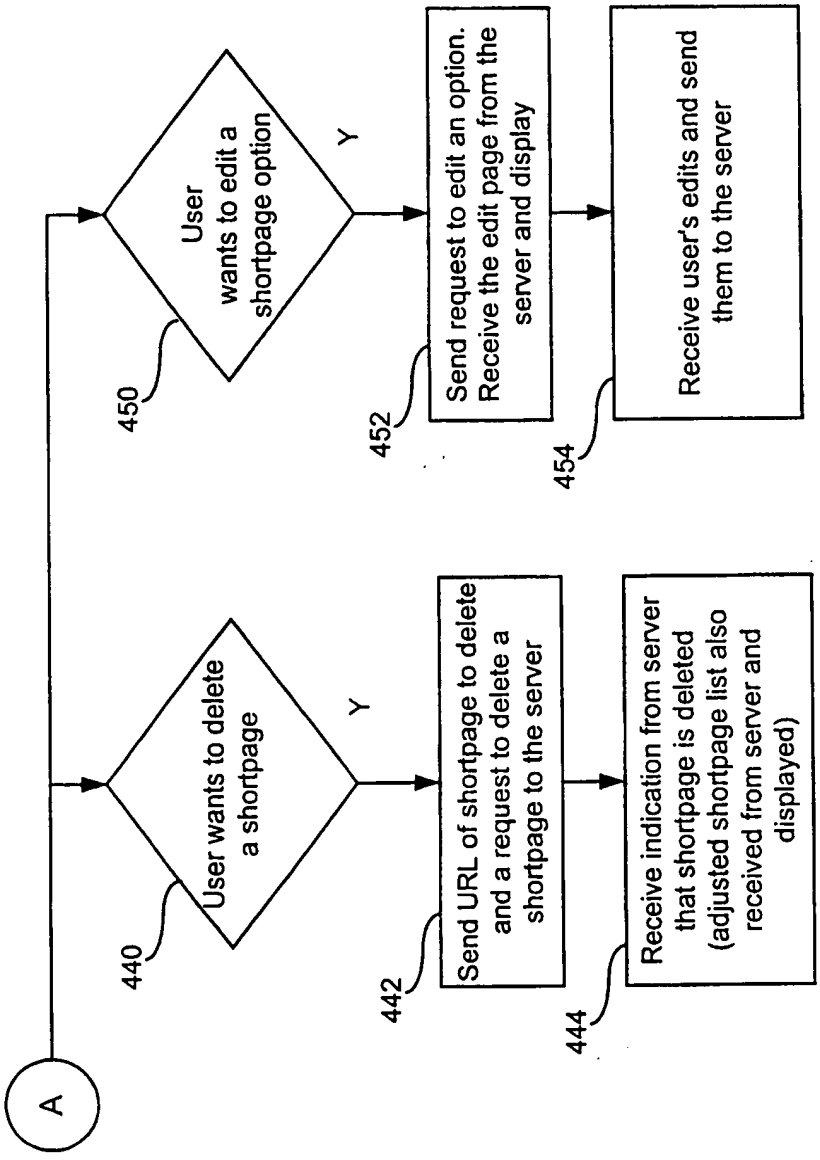


Fig. 4(b)
Shortpage Operations
(Client Side)

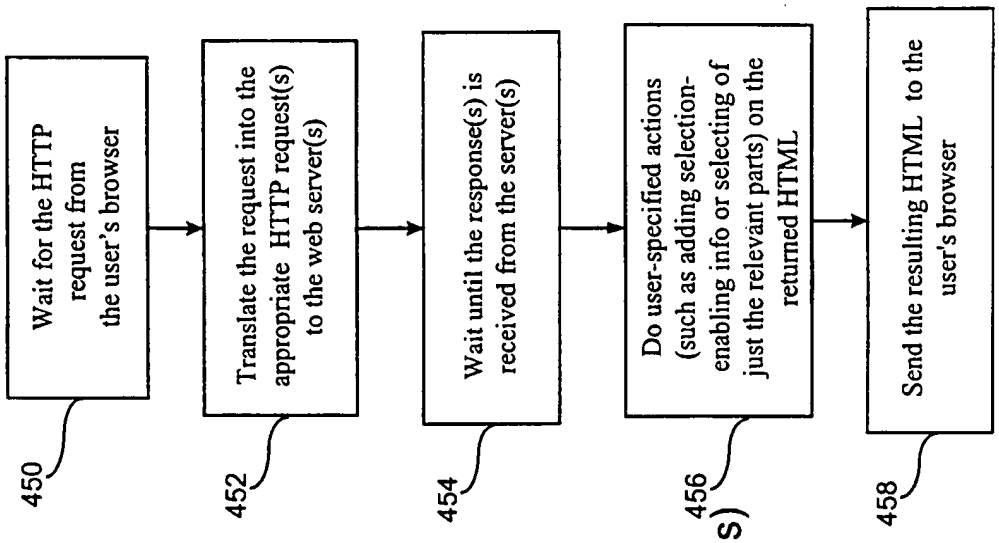


Fig. 4(c)
Shortpage Operations
(overview of server actions)

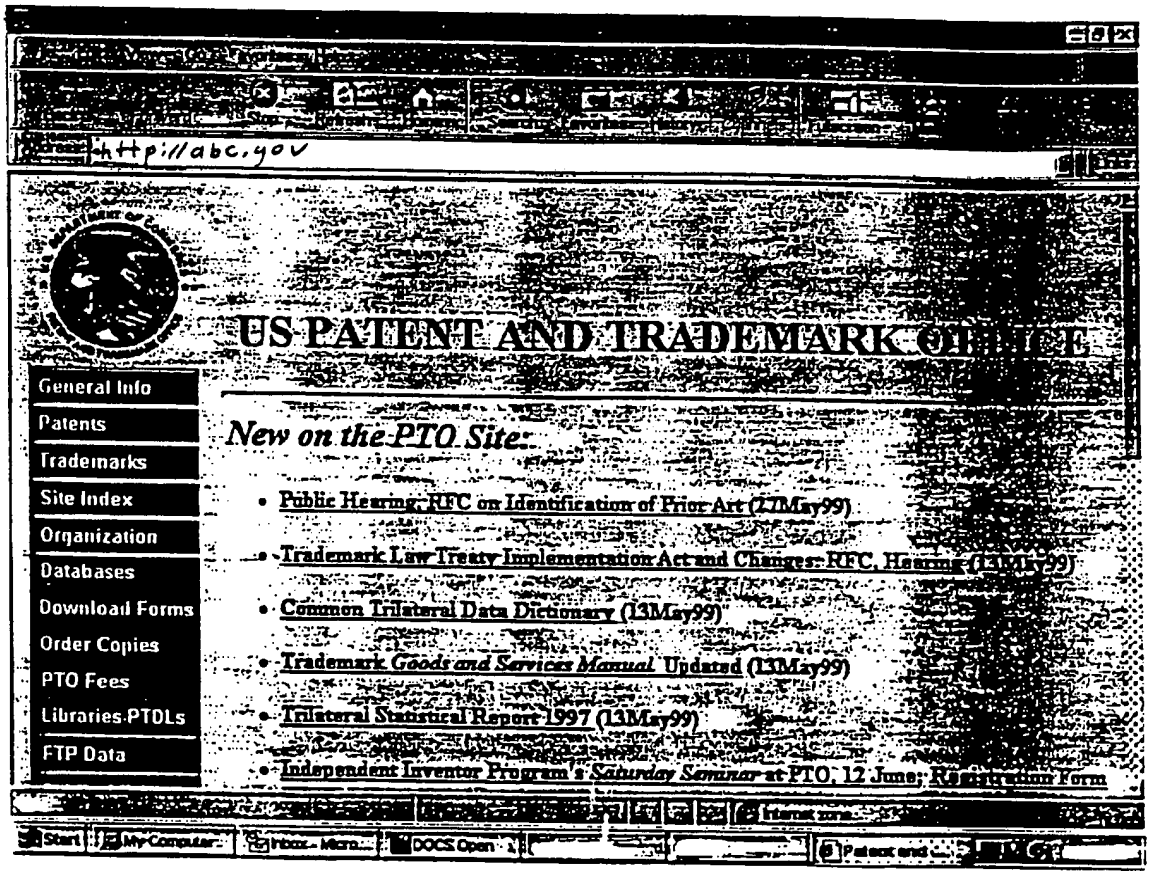


Fig 5(a)
A web page

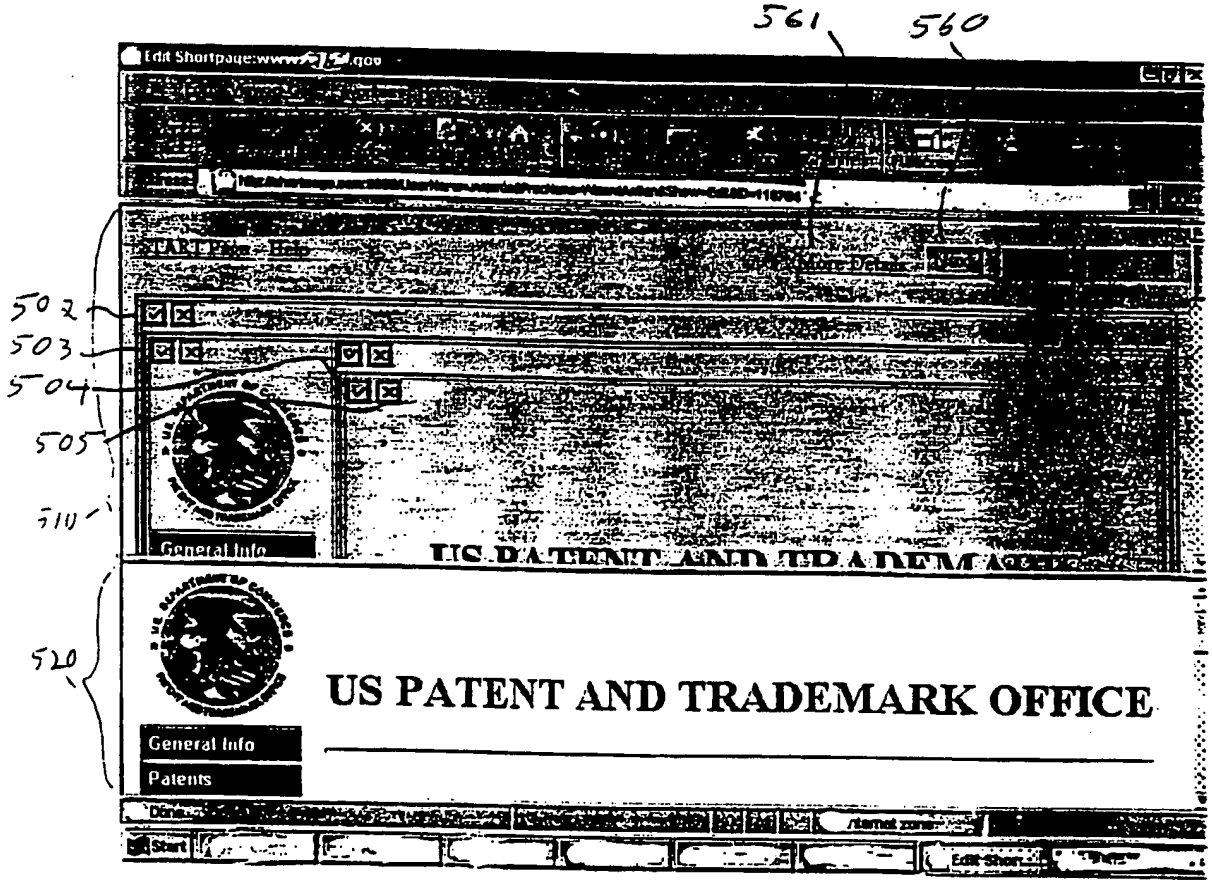


Fig. 5(b)
Create/Edit Shortpage

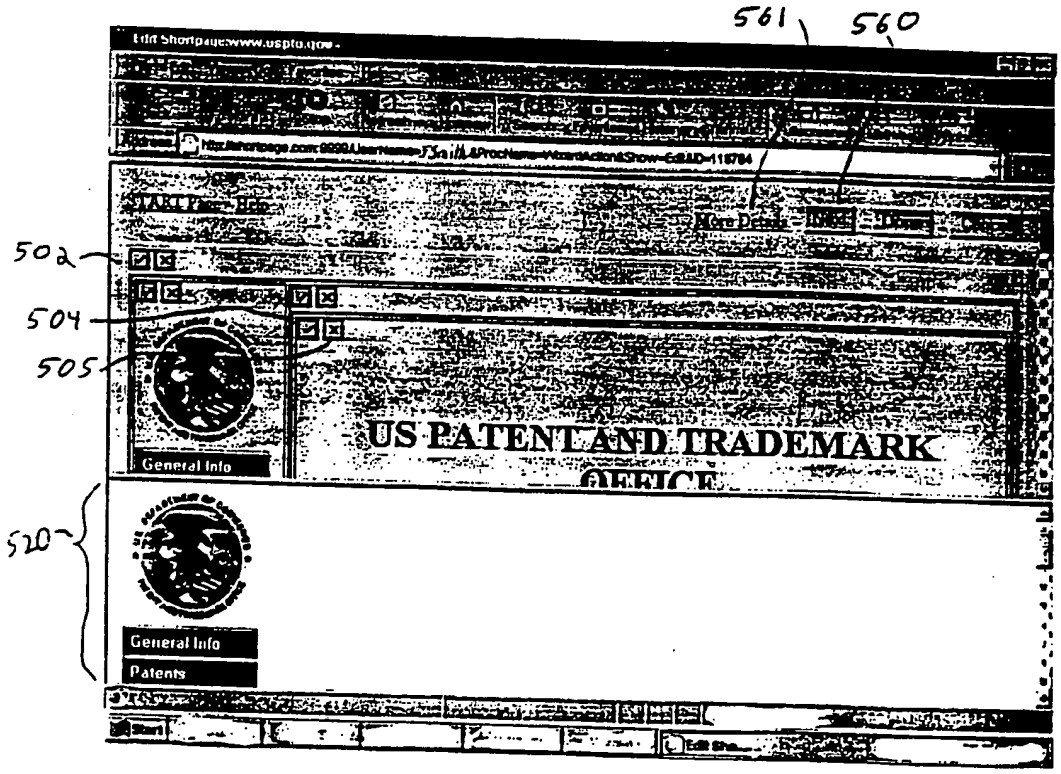


Fig 5(c)

Create/Edit Shortpage

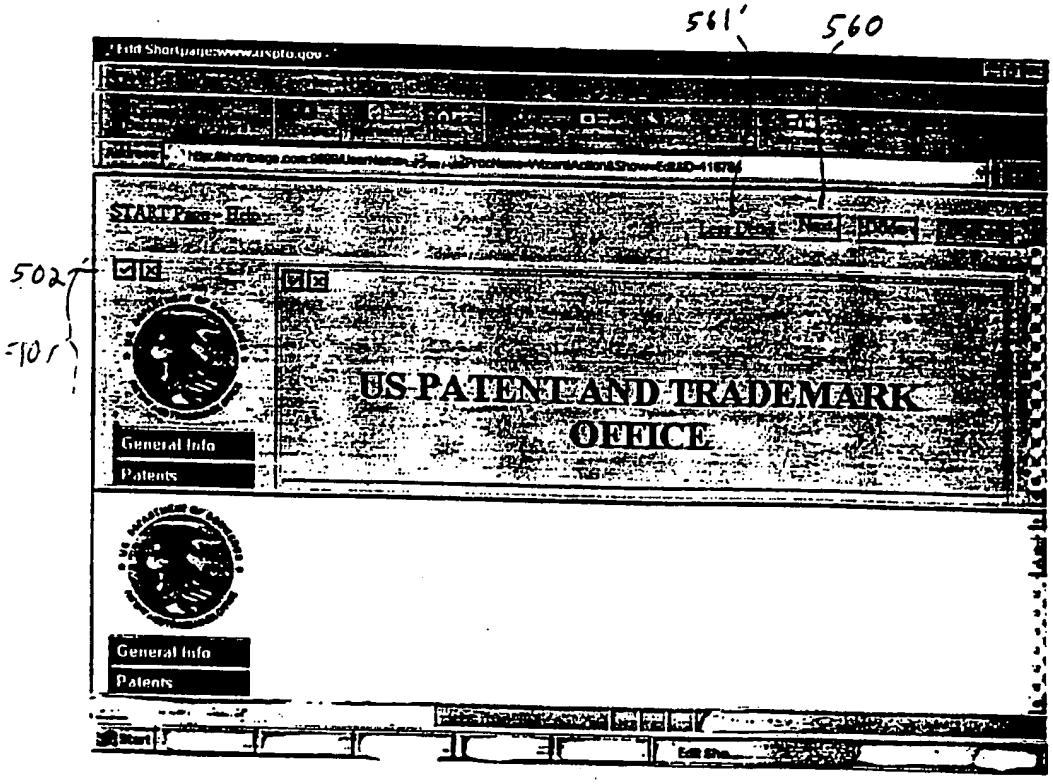


Fig. 5(d)
Create/Edit Shortpage

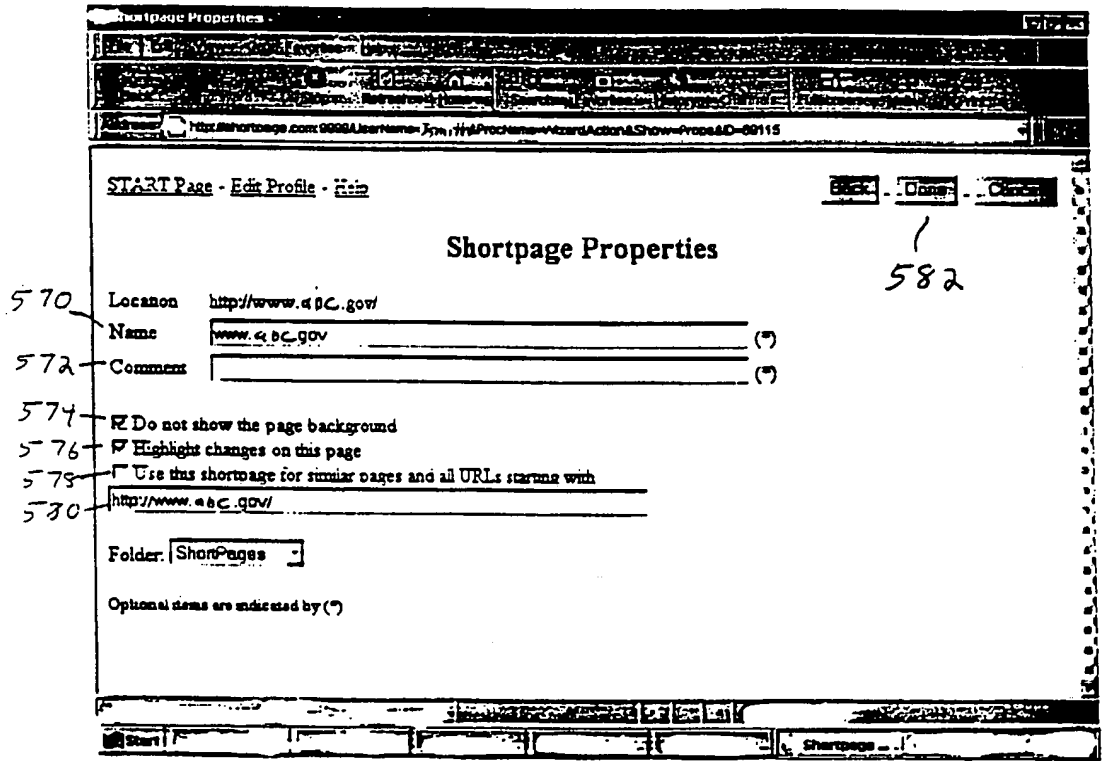


Fig 5(e)
Shortpage Properties

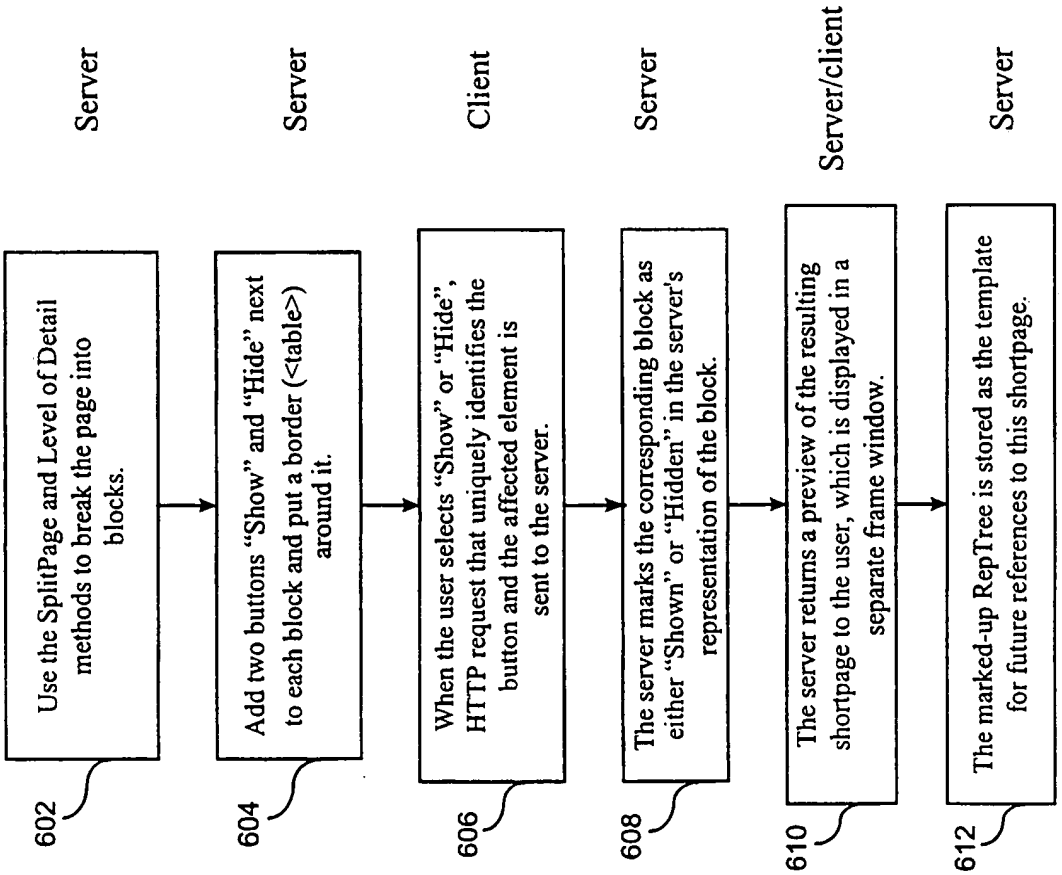
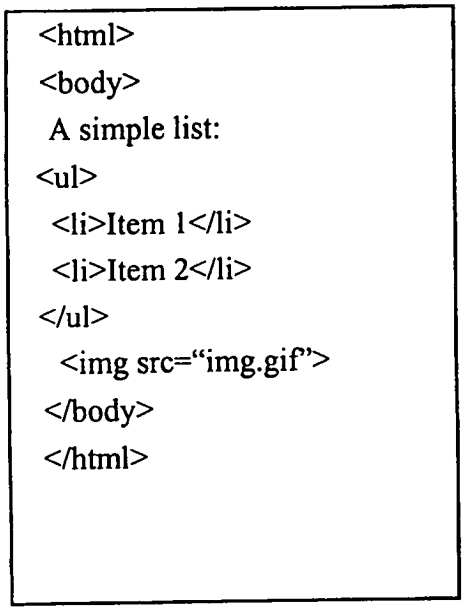
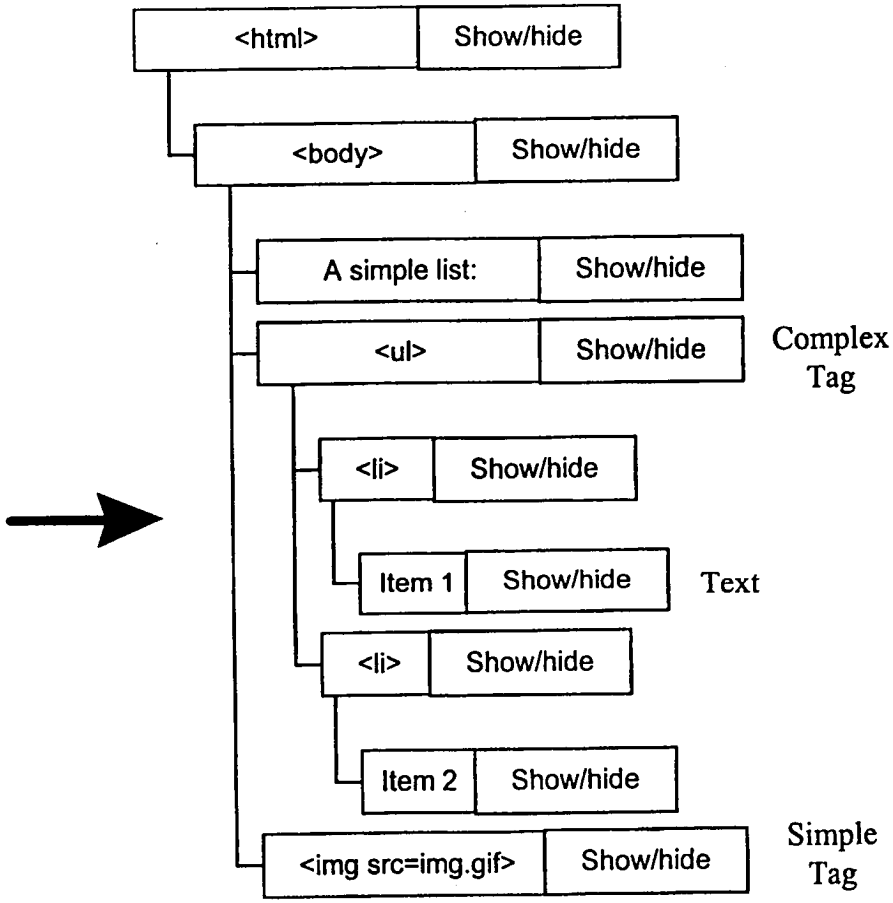


Fig. 6
Creating/Editing a Shortpage



HTML file



Representation Tree (RepTree).
Includes Complex Tag, Simple Tags, and Text nodes.

Fig. 7
HTML Parsing

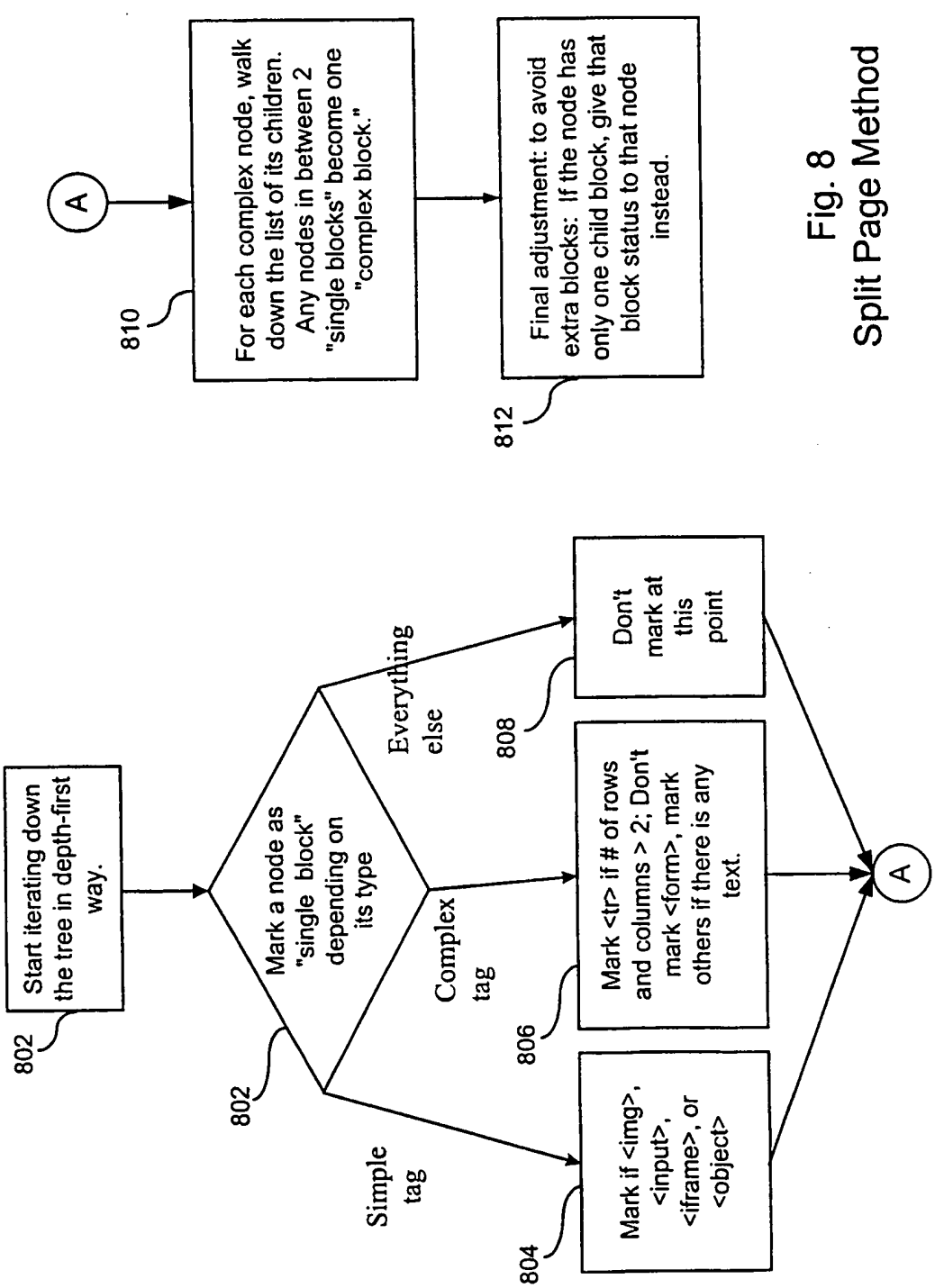


Fig. 8
Split Page Method

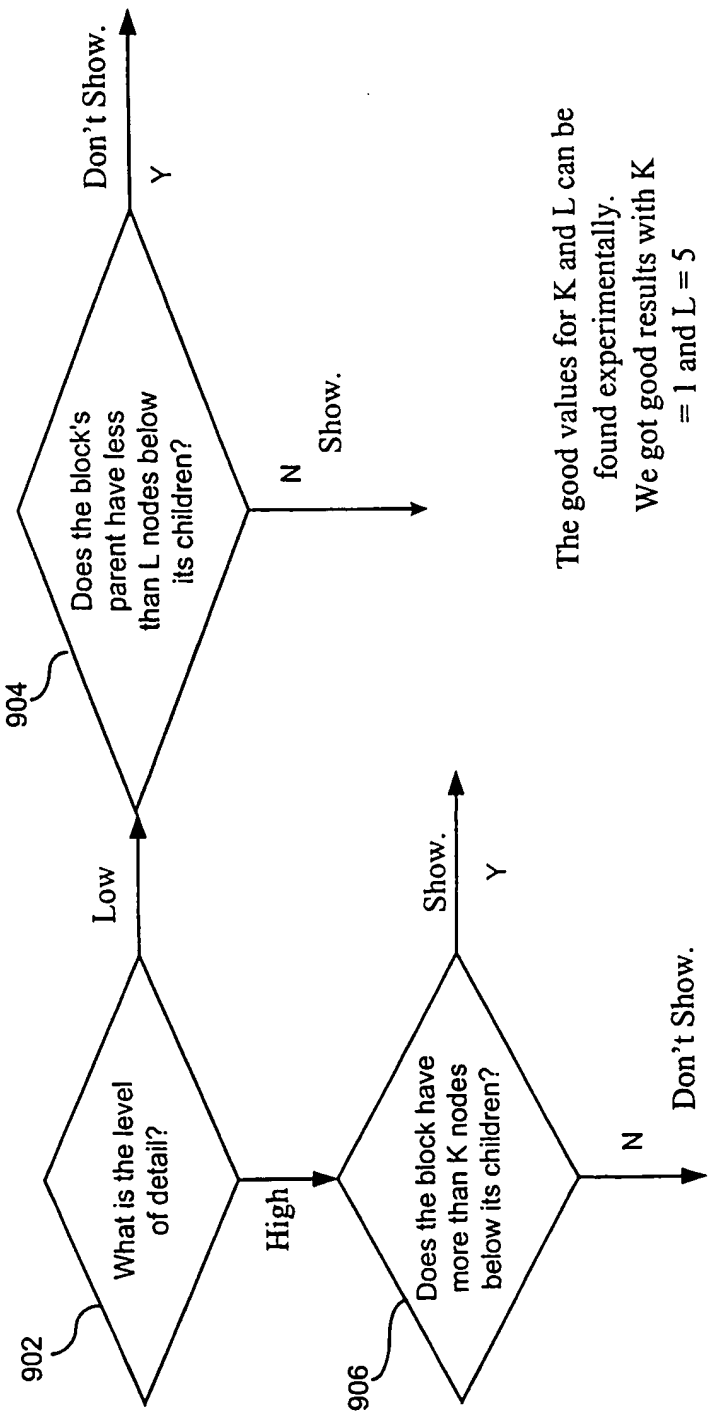


Fig. 9

The level of detail feature is used to decrease the number of blocks displayed at any given time. Any number of levels can be supported. This flow chart demonstrates how to work with two levels.

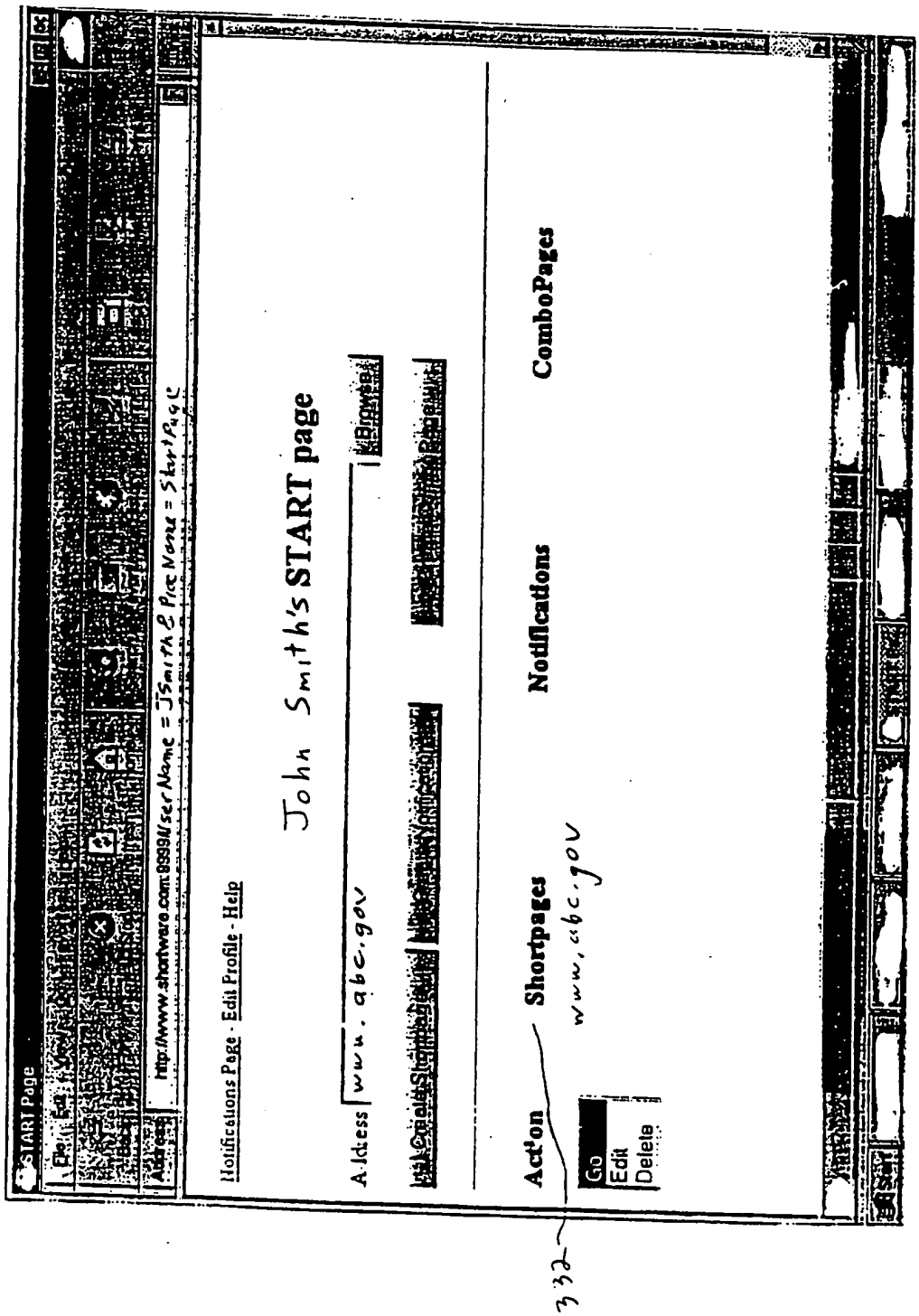


Fig. 10
After Creating a Shortpage

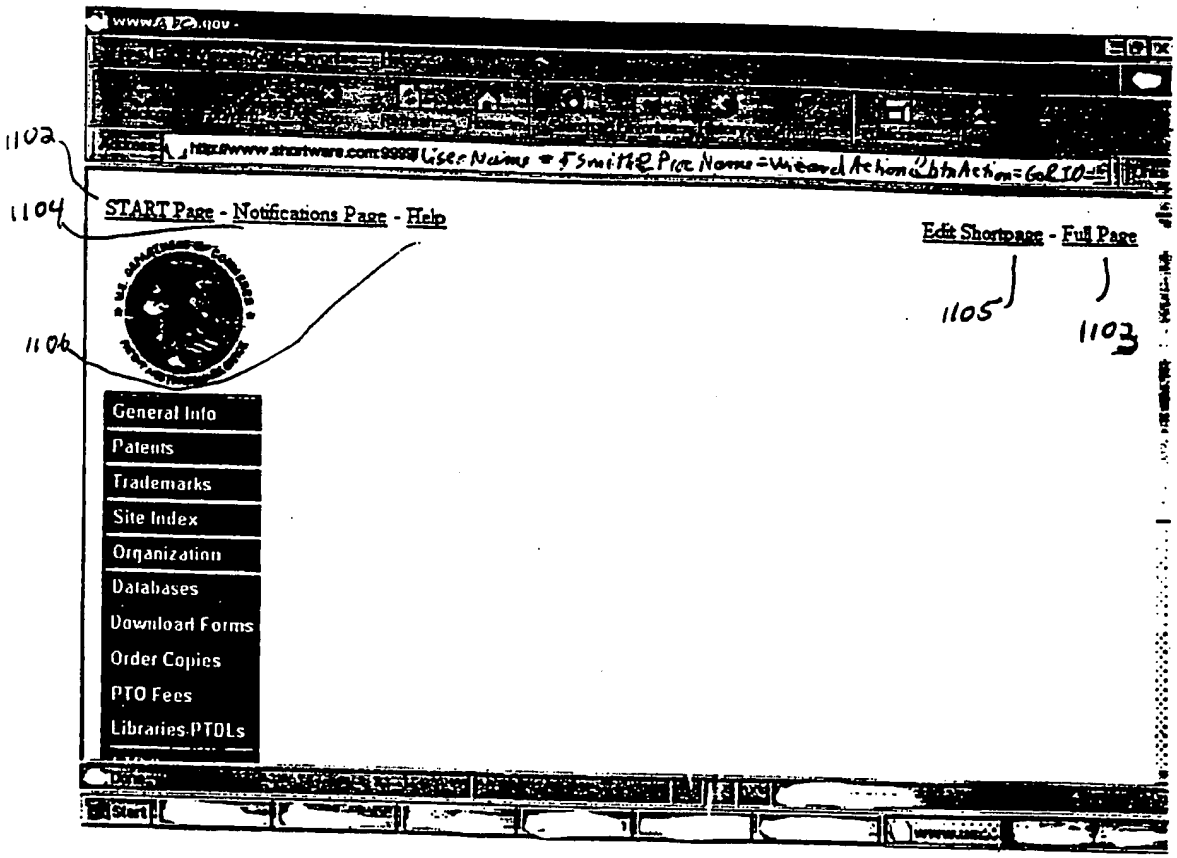


Fig. 11
Viewing a Shortpage

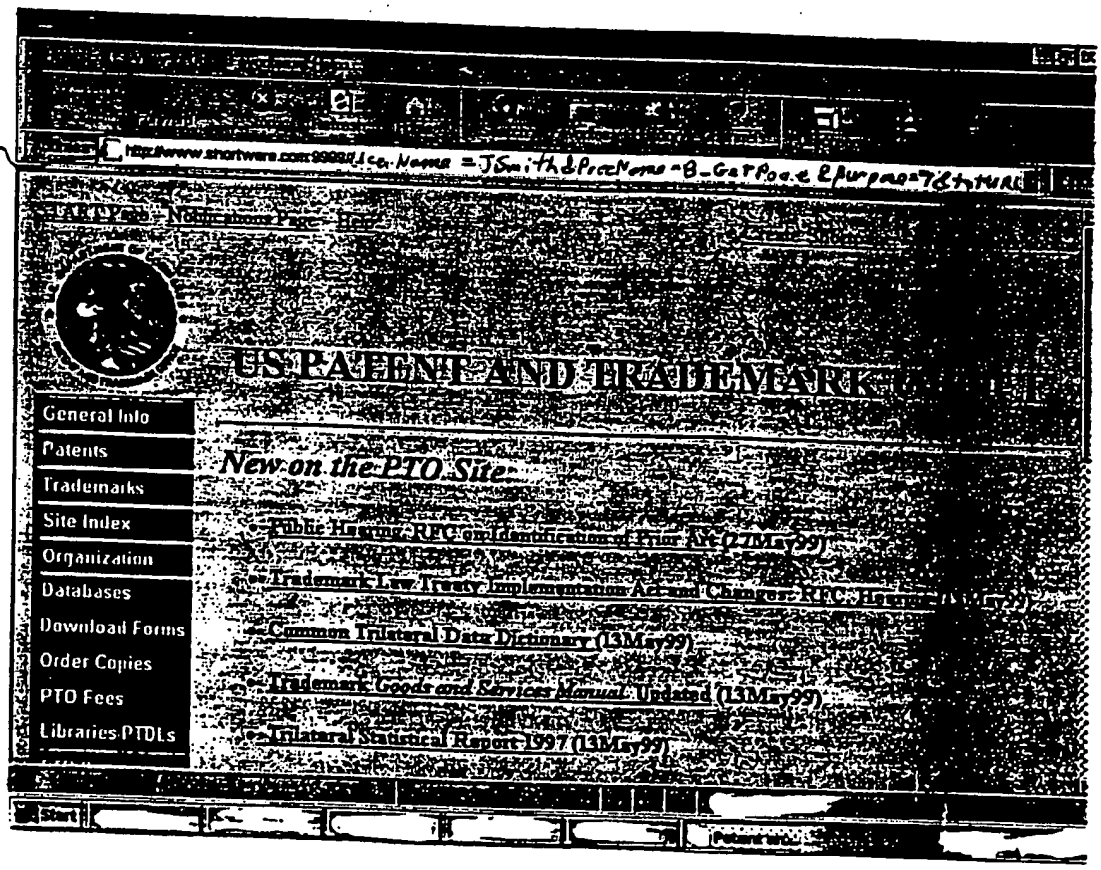


Fig. 12
Viewing a Fullpage

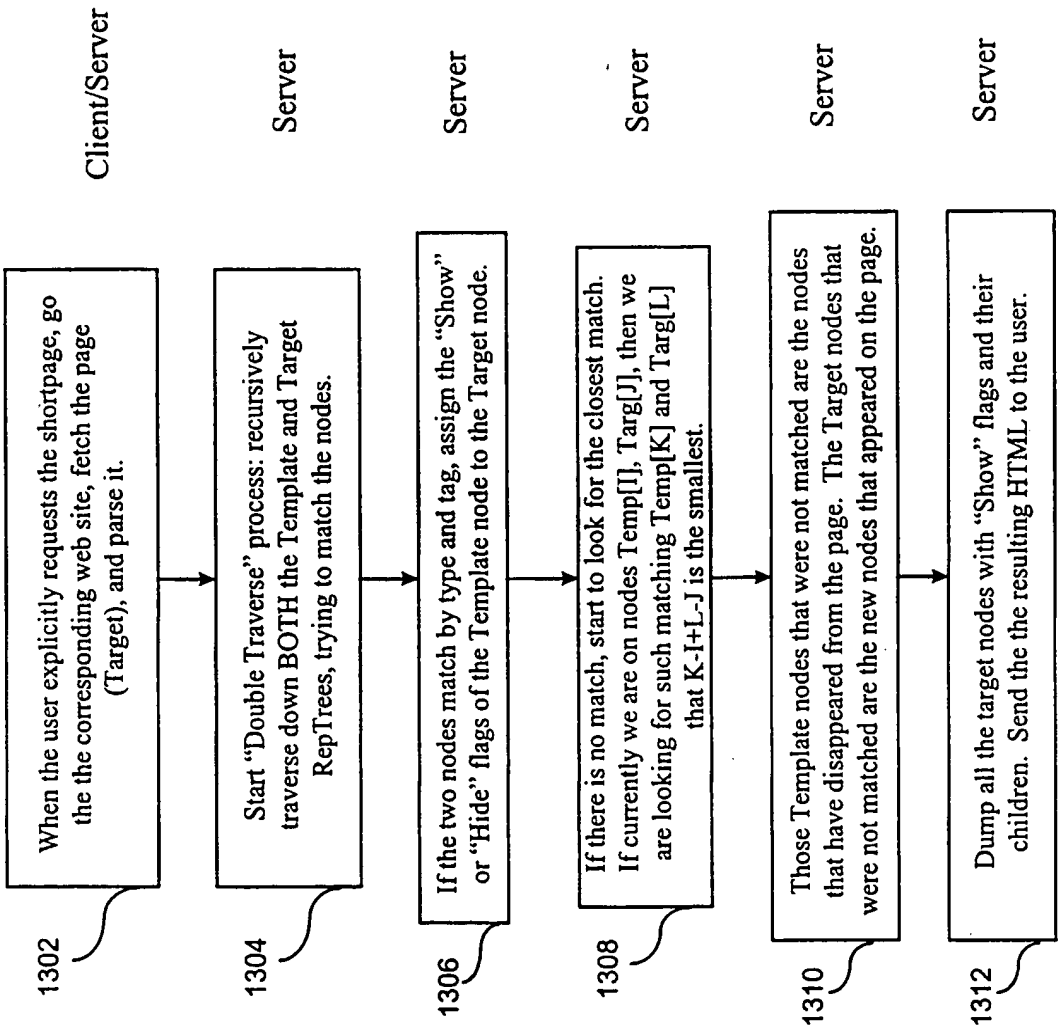


Fig. 13
Viewing a Shortpage

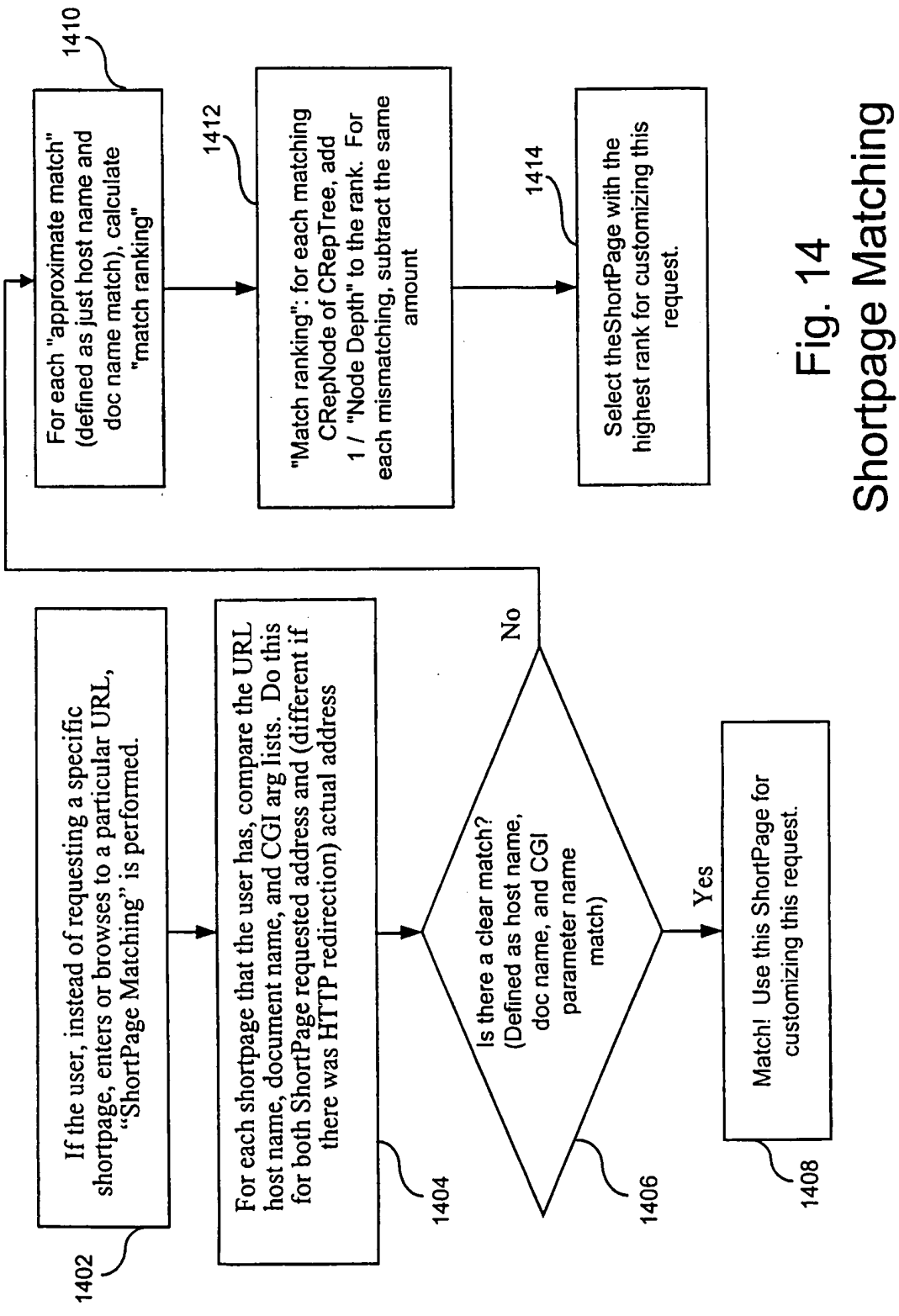


Fig. 14
Shortpage Matching

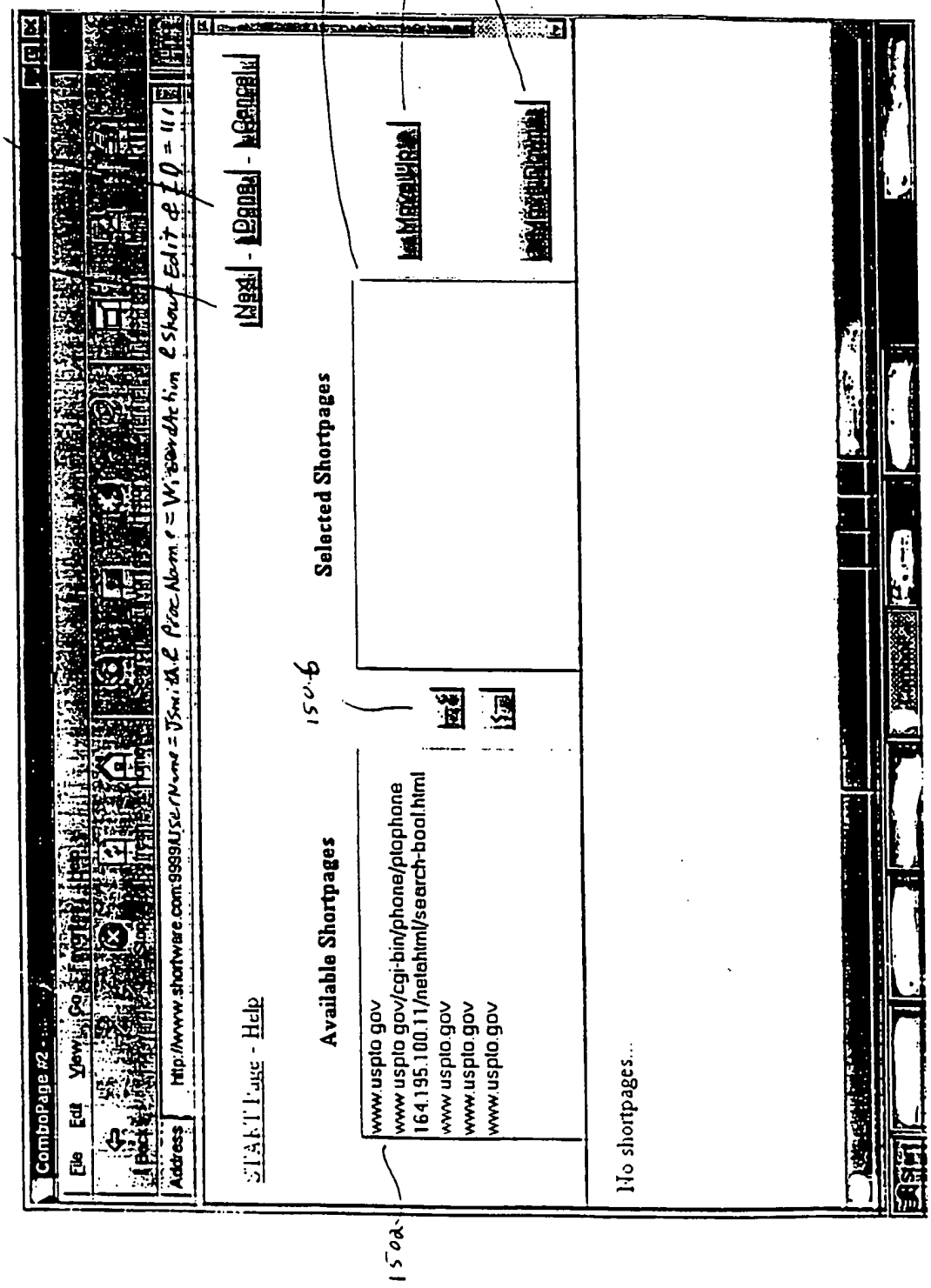

1508
1510
1504
1508
1508
1506
1502
Next - Done - Cancel
Selected Shortpages
Available Shortpages
www.uspto.gov
www.uspto.gov/cgi-bin/phone/ptophone
164.195.100.11/netahtml/search-bool.html
www.uspto.gov
www.uspto.gov
www.uspto.gov
No shortpages...

Fig. 15(a)

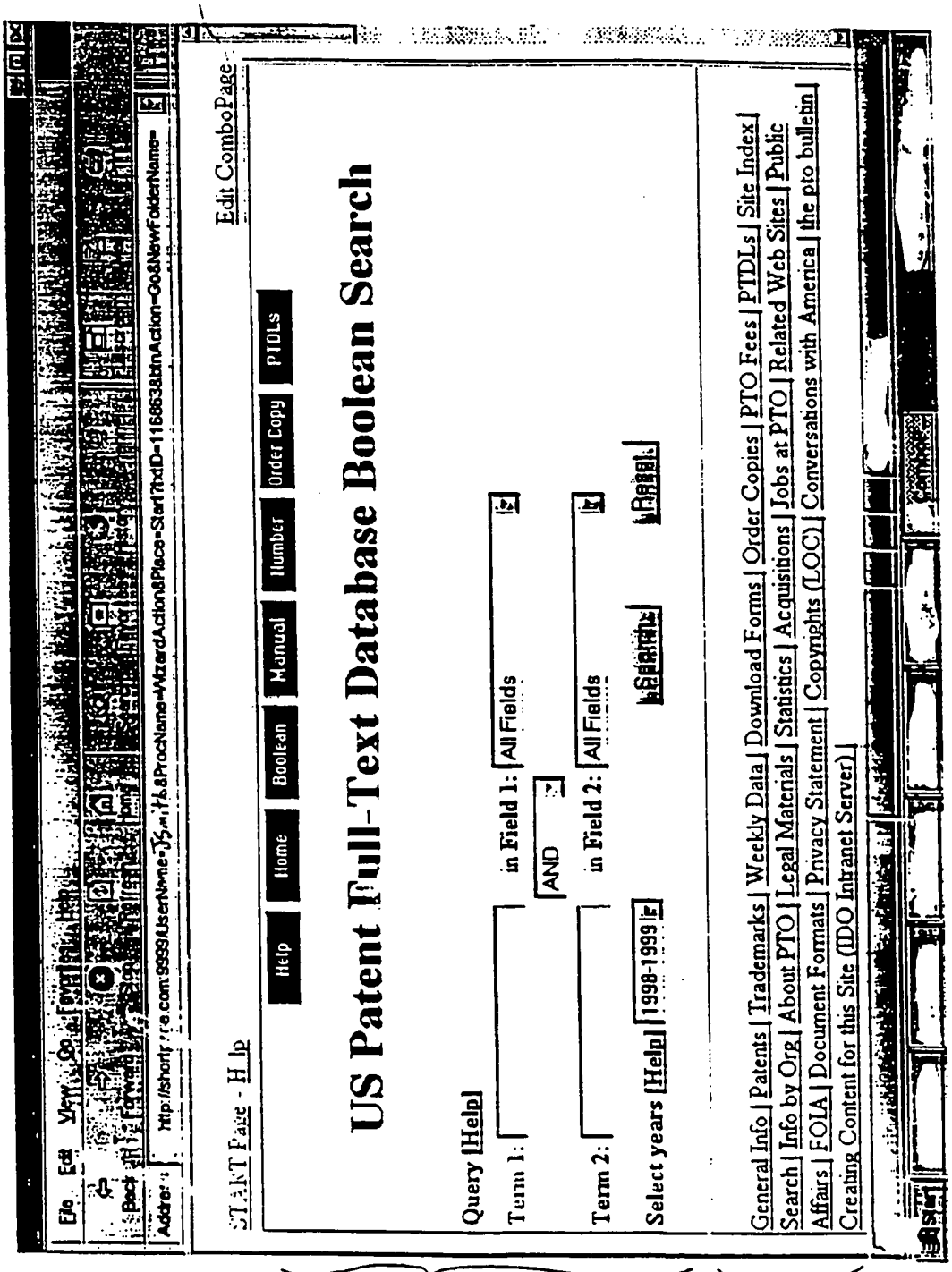

1556
US Patent Full-Text Database Boolean Search
Help
Home
Boolean
Manual
Number
Order Copy
PTDLs
Edit ComboPage
START Page - Help
Query [Help]
Term 1:
in Field 1: All Fields
AND
Term 2:
in Field 2: All Fields
Select years [Help] 1998-1999
Search
Reset
General Info | Patents | Trademarks | Weekly Data | Download Forms | Order Copies | PTO Fees | PTDLs | Site Index | Search | Info by Org | About PTO | Legal Materials | Statistics | Acquisitions | Jobs at PTO | Related Web Sites | Public Affairs | FOIA | Document Formats | Privacy Statement | Copyrights (LOC) | Conversations with America | the pto bulletin | Creating Content for this Site (MDO Intranet Server) |
1552
1554

Fig 15(b)

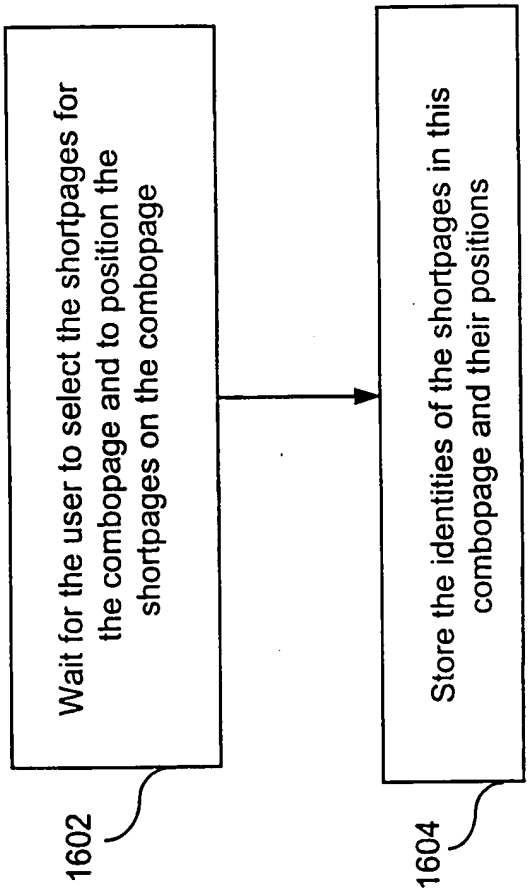


Fig. 16(a)
Creating a Combopage

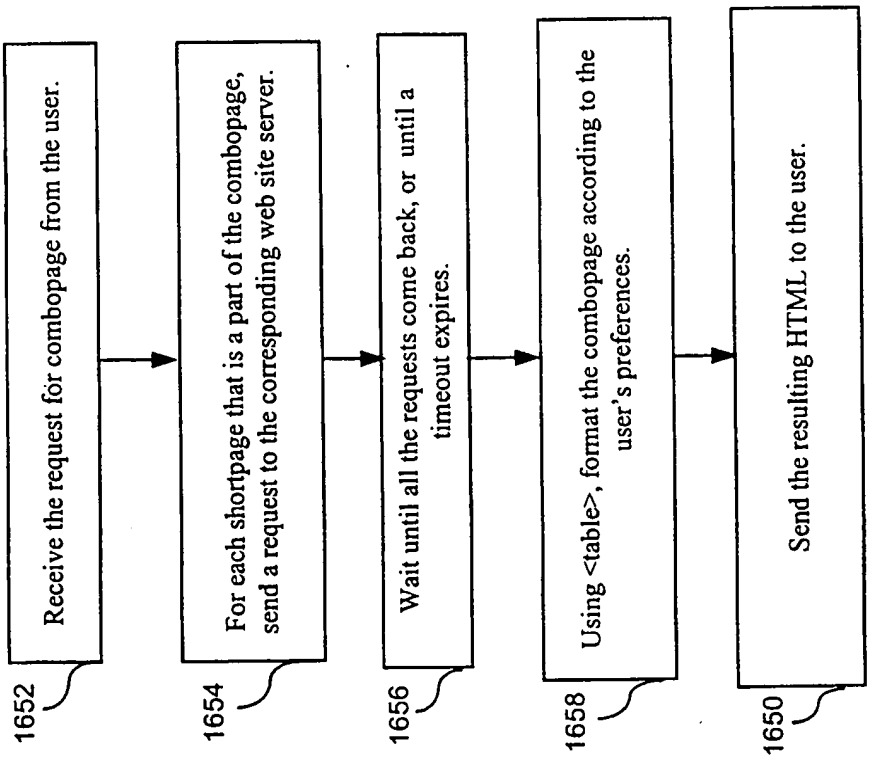


Fig. 16(b)
Displaying a Combopage (server side)

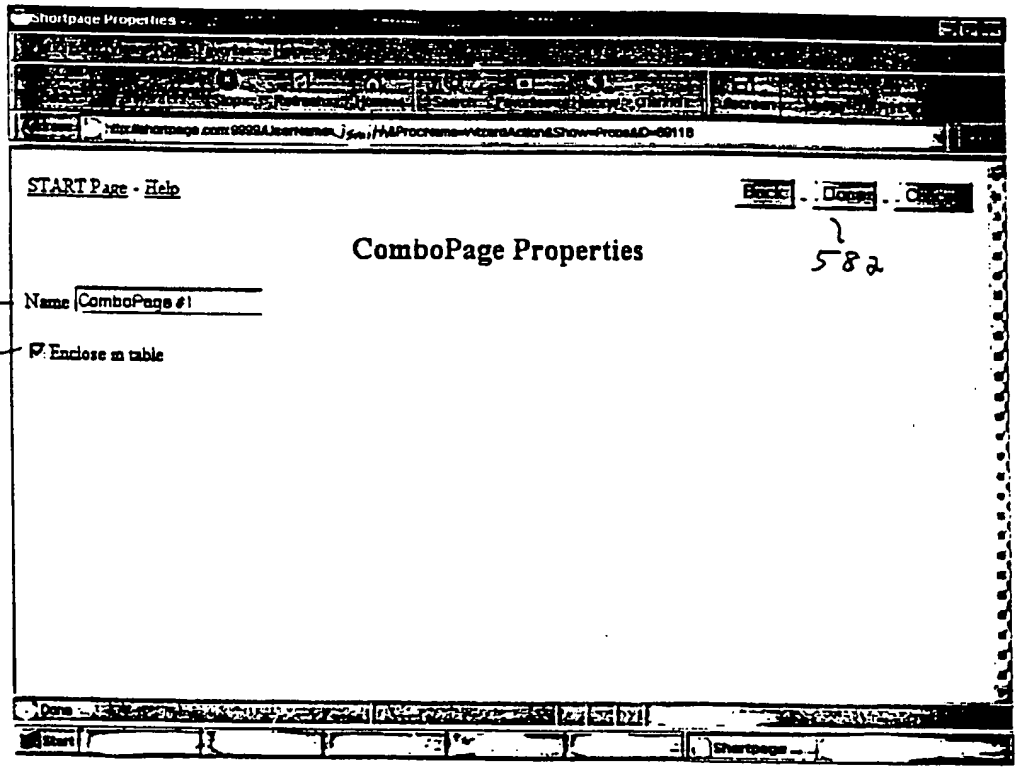


Fig. 16(c)
Combopage Properties

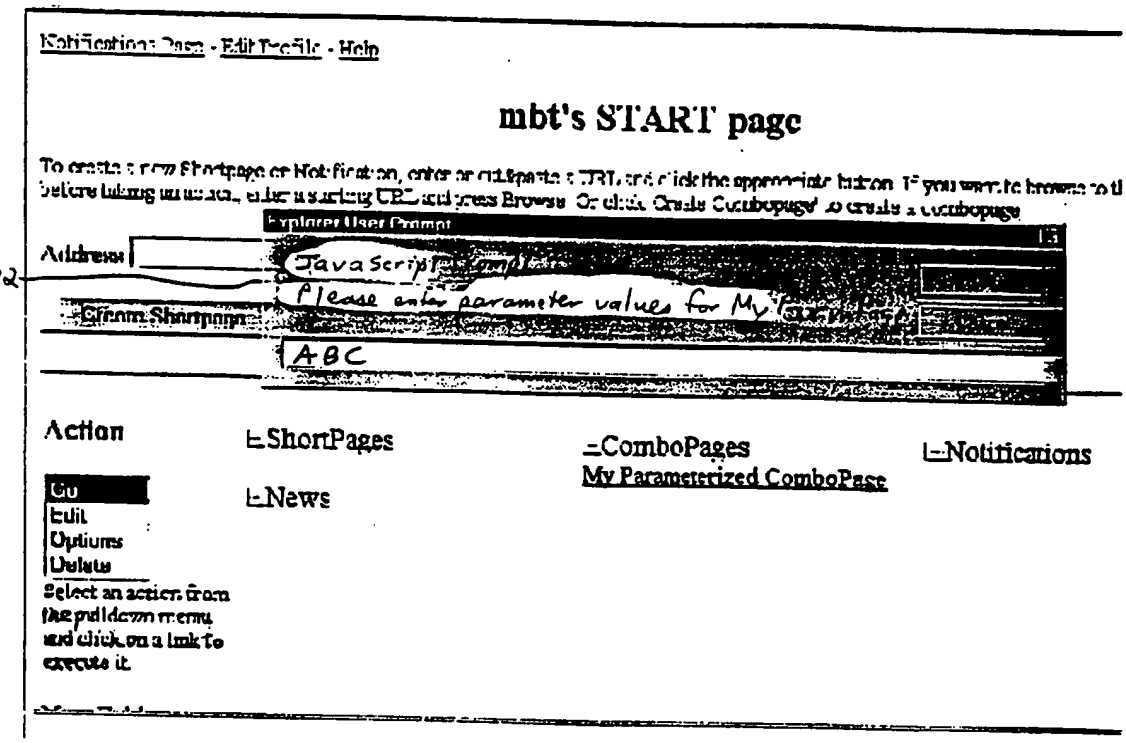


Fig. 17(a)
Entering a Parameter

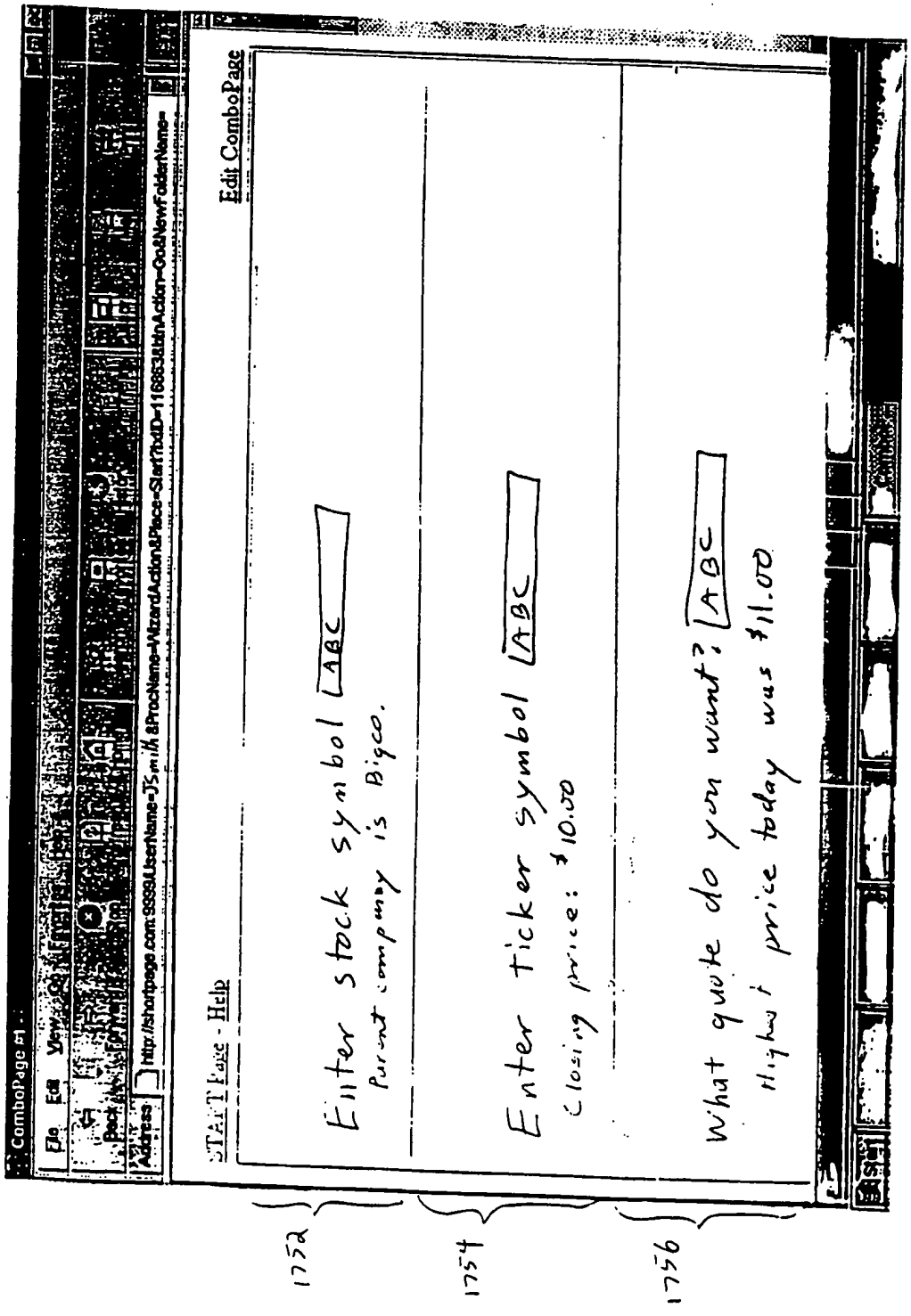


Fig 17(b)
A customized Combopage

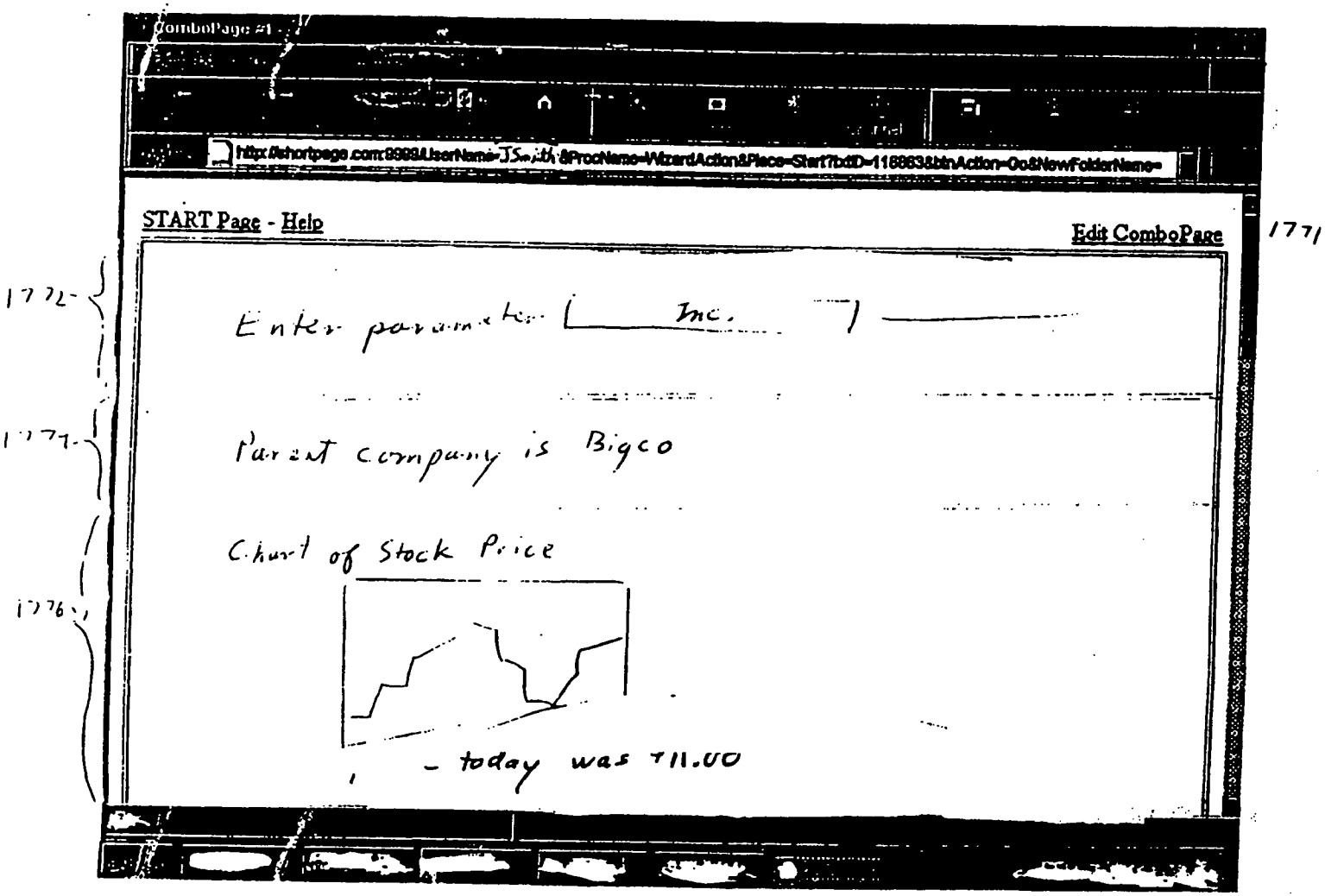


Fig 17(c)
A Parameterized Combopage

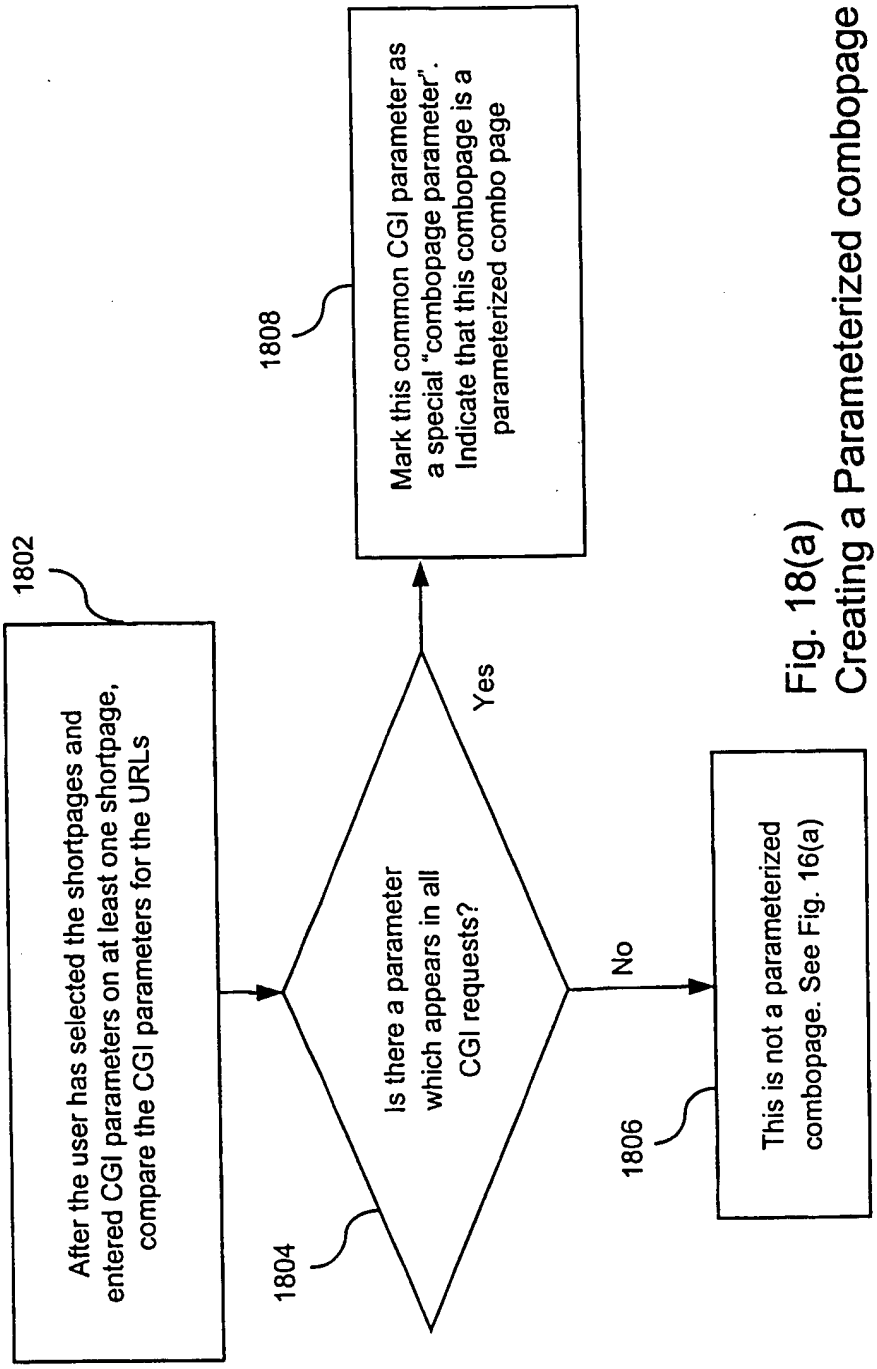


Fig. 18(a)
Creating a Parameterized combopage

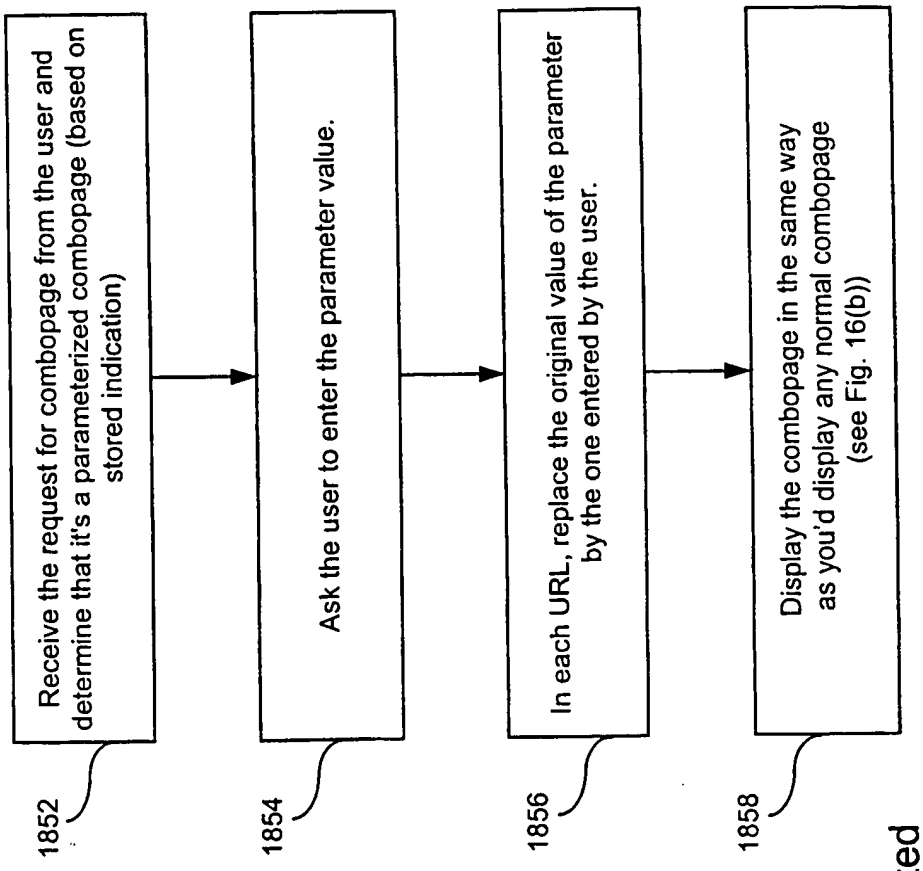


Fig. 18(b)
Displaying a Parameterized Combopage

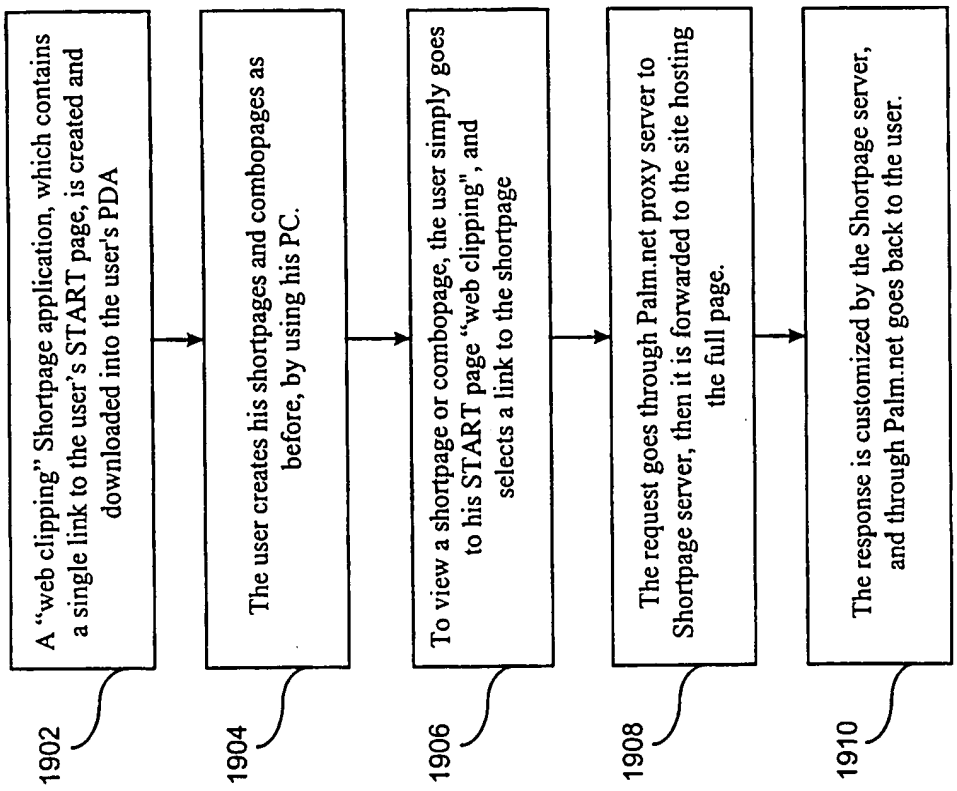


Fig. 19
Mobile Client

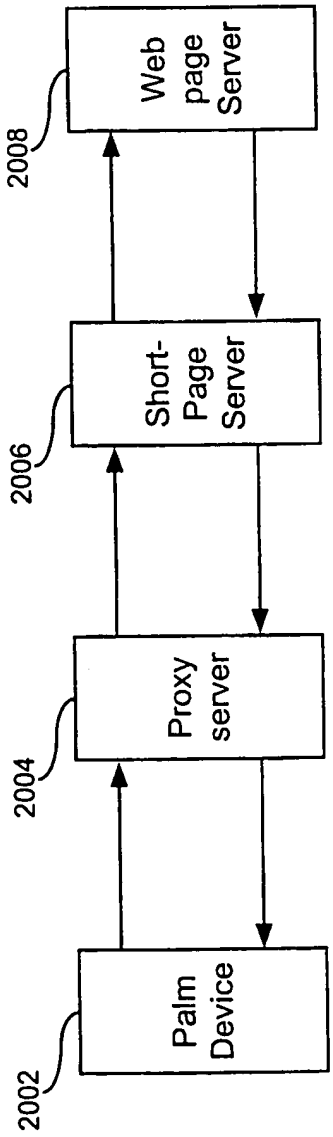

Web page Server
2008
Short-Page Server
2006
Proxy server
2004
Palm Device
2002

Fig. 20

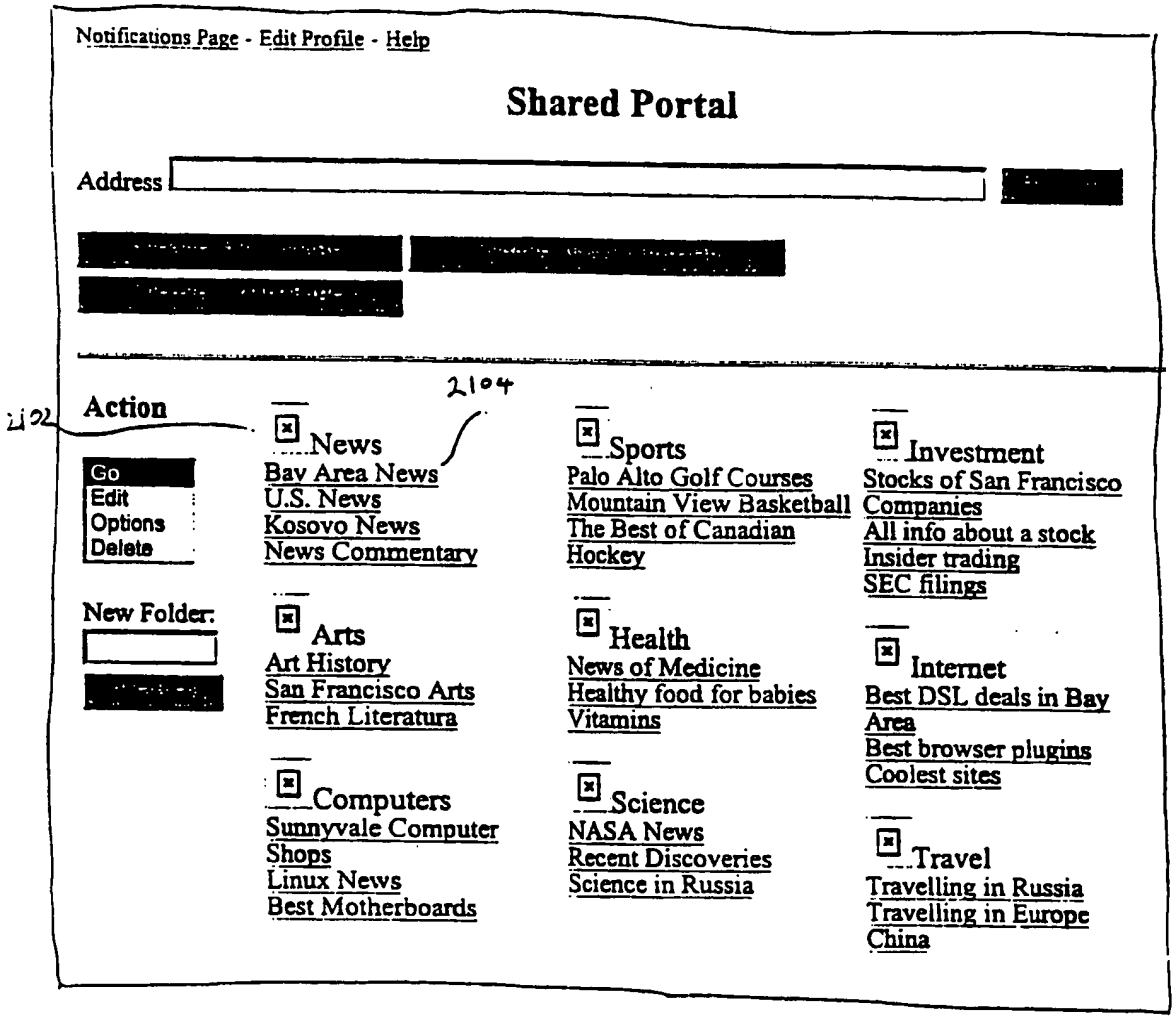

Notifications Page - Edit Profile - Help
Shared Portal
Address
2102
Action
Go
Edit
Options
Delete
New Folder:
2104
News
Bay Area News
U.S. News
Kosovo News
News Commentary
Sports
Palo Alto Golf Courses
Mountain View Basketball
The Best of Canadian Hockey
Investment
Stocks of San Francisco Companies
All info about a stock
Insider trading
SEC filings
Arts
Art History
San Francisco Arts
French Literatura
Health
News of Medicine
Healthy food for babies
Vitamins
Internet
Best DSL deals in Bay Area
Best browser plugins
Coolest sites
Computers
Sunnyvale Computer Shops
Linux News
Best Motherboards
Science
NASA News
Recent Discoveries
Science in Russia
Travel
Travelling in Russia
Travelling in Europe
China

Fig. 21